

HOWARD I. BROWMAN CURRICULUM VITAE

Place of Birth: Montréal, Québec, Canada
Citizenship: Canadian (Permanent resident of Norway)
Married to Anne Berit Skiftesvik

Languages: Fluent in English & French;
working knowledge of Norwegian

Home Address

Fiskarhaugane 2
N-5215 Lysekloster
NORWAY
Tel. 47 56 30 92 85

Work Address

Institute of Marine Research
Austevoll Research Station
5392 Storebø, NORWAY
Tel. 47 98 86 07 78
Email: howard.browman@imr.no
Internet: <http://fishlarvae.org>
Twitter: @HBrowman

EDUCATION

- 1989 Ph.D. in Systematics & Ecology (Limnology, with Honours), University of Kansas [Major advisor: W. John O'Brien - deceased]
- 1985 M.Sc. in Biological Oceanography, McGill University [Major advisor: Brian M. Marcotte]
- 1982 B.Sc. in Marine Biology, McGill University [Double Honours Program, Major advisors: William C. Leggett and Henry M. Reiswig]

CURRENT POSITION

Principal Research Scientist, Norwegian Institute of Marine Research (since March 1998)

CURRENT RESEARCH PROJECTS

- 2018-2021: The importance of the marine habitat for the critically endangered European eel
- 2015-2018: Fine-scale interactions in the plankton: Empirical observations to parameterize trophodynamic and drift models
- 2018-2020: Effects of seismic sound on spawning behaviour and reproductive success of cod
- 2018-2020: Capacity for adaptation to multiple climate change drivers in sub-Arctic invertebrates
- 2018-2020: Effect of multiple climate change drivers on the egg microbiome of Arctic and sub-Arctic copepods
- 2018-2019: The effects of photo-induced toxicity of polycyclic aromatic hydrocarbon on the escape performance and foraging behaviour of larval fish
- 2018-2020: The effects of the anti-sea lice chemotherapeutant, hydrogen peroxide, on non-target planktonic organisms around salmon farms
- 2018-2022: Decoding the sensory cues that link the salmon louse to its host: transcriptomics-physiology-behaviour-ecology
- 2018-2020: Optimizing the use of cleanerfish on salmon farms
- 2018-2020: Population dynamics of wild wrasse populations along the Norwegian coast

RESEARCH INTERESTS

- Zooplankton and ichthyoplankton behaviour and ecology
- Predator-prey interactions on fine spatiotemporal scales

- Sensory ecology
- Host-finding in fish parasites
- Effects of solar ultraviolet radiation, ocean acidification and climate change on aquatic organisms and ecosystems
- Marine policy (mainly ecosystem-based management and protected areas)
- Critically evaluating how scholarly performance is measured
- Characterizing the bureaucratisation of scholarly institutions and its impacts
- Scientific publishing (e.g. best practices, editor and author ethics, peer review, open access, open science, preprint servers...)

PREVIOUS POSITIONS

12/04 – 11/07	Scientific Director, Inter-Research Science Center
10/94 - 08/01	Adjunct Assistant Professor, Department of Oceanography, University of Québec at Rimouski, Rimouski, Québec, CANADA
05/94 - 03/98	Research Scientist, Department of Fisheries and Oceans Canada, Maurice-Lamontagne Institute, Marine Science Research Centre, Mont-Joli, Québec, CANADA
06/94 - 05/97	Adjunct Assistant Professor, Department of Biology, Concordia University, Montréal, Québec, CANADA
07/93 - 04/94	Postdoctoral Research Fellow, Department of Fisheries and Oceans Canada, Maurice-Lamontagne Institute, Mont-Joli, Québec, CANADA [with J.A. Runge]
09/90 - 07/93	Postdoctoral Research Fellow, Medical Research Council of Canada. University of Victoria [with C.W. Hawryshyn]
09/89 - 08/90	Postdoctoral Research Fellow, Hamilton Foundation of Canada (E.B. Eastburn Fellow). University of Montréal [with M.A. Ali] and McGill University [with W.C. Leggett]
08/85 - 05/89	Research Assistant, University of Kansas [with W. John O'Brien]
09/76 - 08/85 & 06/89 - 08/89	Salesman/assistant manager (audio/video) and consultant to La Place Stores (retailers of photo & audio/video equipment), Montréal, Québec, CANADA
04 - 05/84	Assistant Scientist for SEA SEMESTER, an oceanography field course aboard the staysail schooner R/V Westward. Sea Education Association
12/82 - 01/83	Assistant Scientist, coral reef pollution project, Bellairs Research Institute of McGill University, Barbados, West Indies

FINANCIAL SUPPORT OF RESEARCH AND SCHOLARLY ACTIVITIES

*CAD = Canadian \$

**USD = U.S. \$

***NOK = Norwegian Kroner

Current funding

01/2018 - 12/2021	The Research Council of Norway (MARINFORSK Program), "MAREEL: The importance of the marine habitat for the critically endangered European eel." (Principal investigators = Caroline Durif, Howard Browman, Anne Berit Skiftesvik+++). NOK 11 335 000
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- 01/2018 - 12/2021 Program for Health Management in Aquaculture, Strategic Investment Fund of the Chilean Ministry of Economy, Development and Tourism, "CaligusLIFE: Scientific research of excellence towards understanding sea lice biology and its application in control strategies for the salmon industry". (WP5, Principal investigator = Cristian Gallardo+++; WP5 Co-investigators = Howard Browman, Anne Berit Skiftesvik, David Fields). 795.818.000 Chilean pesos total funding for the entire project
- 01/2018 – 12/2020 Institute of Marine Research, "Marine Cladocerans as a model system to decompose genetic vs epigenetic mechanisms of adaptation to ocean acidification and warming." (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields, Caroline Durif). NOK 2 898 000
- 01/2018 – 12/2020 Fram Centre, "Marine Cladocerans as a model system to decompose genetic vs epigenetic mechanisms of adaptation to ocean acidification and warming." (Principal Investigators: Howard Browman, Haakon Hop, Anne Berit Skiftesvik, David Fields, Caroline Durif, Peter Countway, Neel Aluru). NOK 2 428 000
- 01/2018 - 12/2020 Institute of Marine Research, "Effects of anti salmon lice chemicals on non-target organisms." (Principal investigators = Ole Samuelsen, Ann-Lisbeth Agnalt, Howard Browman, Anne Berit Skiftesvik, Caroline Durif). NOK 3 000 000
- 01/2018 – 12/2019 Institute of Marine Research. "The effects of photo-induced toxicity of PAHs on foraging behaviour and escape performance of larval fish". (Principal Investigators: Bridie Jean Marie Allan, Sonnich Meier, Howard Browman, Anne Berit Skiftesvik, Valeriya Komyakova, Carey Donald, Elin Sørhus, Olav Sigurd Kjesbu). NOK 1 261 000
- 01/2015 – 12/2018 Institute of Marine Research. "Fine-scale interactions in the plankton – empirical observations to parameterize trophodynamic and drift models". (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields & Caroline Durif). NOK 4 300 000

Pending applications

- 01/2019 - 12/2022 Research Council of Norway (MARINFORSK Program), "Hybridization in the *Calanus* species complex." (Principal Investigators = Howard Browman, Tor Knudsen, Espen Bagøien, María Quintela, Kevin Glover, David Fields, Stephane Plourde, Genevieve Parent, Frederic Maps, Ann Bucklin, Anne Berit Skiftesvik, Øystein Varpe). NOK 12 631 000

Previous funding (as Principal Investigator, except where noted)

- 01/2018 - 12/2018 Institute of Marine Research, "Spatial changes and connectivity of marine fish populations and their implications for fisheries management." (Principal investigators = Howard Browman). NOK 300 000
- 01/2015 – 12/2017 Institute of Marine Research, "Effects of increased CO₂/lower pH – and temperature - on vital rates of the planktonic copepod, *Calanus finmarchicus*." (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields, Jeffrey Runge Caroline Durif). NOK 2 700 000
- 01/2015 – 12/2017 Fram Centre, "Effects of increased CO₂/lower pH – and temperature - on vital rates of the planktonic copepod, *Calanus glacialis*." (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields, Jeffrey Runge Caroline Durif, Andrew Mount, Michael Arts). NOK 3 000 000
- 01/2014 – 12/2017 Arctic Monitoring and Assessment Programme (AMAP), "AMAP Assessment on Acidification of the Arctic Ocean and its Consequences on Biota". (Principal Investigator: Howard Browman). NOK 2 400 000

- 01/2013 - 12/2016 The Research Council of Norway (HAVKYST Program). "Impact of ocean acidification on Arctic zooplankton populations" (Principal Investigators = Haakon Hop, Peter Thor, Claudia Halsband, Howard I. Browman). NOK 3 600 000
- 01/2011 – 12/2014 Institute of Marine Research. "Fine-scale interactions in the plankton – empirical observations to parameterize trophodynamic models". (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields & Caroline Durif). NOK 4 000 000
- 01/2012 – 12/2014 Institute of Marine Research, "Effects of increased CO₂/lower pH – and temperature - on vital rates of the planktonic copepod, *Calanus finmarchicus*, with an emphasis on the overwintering life stages." (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields, Jeffrey Runge Caroline Durif, V. Thiyagarajan). NOK 2 700 000
- 01/2012 – 12/2014 Fram Centre, "Effects of increased CO₂/lower pH – and temperature - on vital rates of the planktonic copepod, *Calanus glacialis*." (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields, Jeffrey Runge Caroline Durif, V. Thiyagarajan). NOK 2 700 000
- 01/2014 - 06/2015 The Research Council of Norway (HAVKYST Program). "In situ swimming and orientation ability of larval cod and other plankton. Parameterizing models of prey availability to top predators" (Principal Investigators = Howard I. Browman, Claire Paris, Frode Vikebø, Anne Berit Skiftesvik). NOK 142 000
- 01/2010 - 12/2014 The Research Council of Norway (Strategic Institute Program). "Effects of climate change on the *Calanus* complex (ECCO)" (Principal Investigators = Webjørn Melle, Espen Bagøien, Howard Browman & Geir Huse). NOK 37 084 000
- 03/2011 – 12/2013 Arctic Monitoring and Assessment Programme (AMAP), "AMAP Assessment on Acidification of the Arctic Ocean and its Consequences on Biota". (Principal Investigator: Howard Browman). NOK 200 000
- 01/2012 – 12/2012 Institute of Marine Research, "Upgrade of silhouette imaging system to high-speed full HD". (Principal Investigators: Howard Browman & Anne Berit Skiftesvik). NOK 350 000
- 04/2012 - 12/2012 The Research Council of Norway (FØRNY Program – Industrial Design). Designing an inexpensive salmon lice trap. (Principal Investigators = Katinka von der Lippe (Eker Design), Howard I. Browman, Anne Berit Skiftesvik, David Fields). NOK 2 200 000
- 01/2010 - 12/2012 The Research Council of Norway. "36th Annual Larval Fish Conference" (Principal Investigators = Howard Browman & Anne Berit Skiftesvik). NOK 100 000
- 01/2012 - 12/2012 Institute of Marine Research. "36th Annual Larval Fish Conference" (Principal Investigators = Howard Browman & Anne Berit Skiftesvik). NOK 400 000
- 01/2012 - 12/2012 The Bergen Marine Cluster. "36th Annual Larval Fish Conference" (Principal Investigators = Howard Browman & Anne Berit Skiftesvik). NOK 40 000
- 01/2010 – 12/2012 The Research Council of Norway (Industry-sponsored Research Project Support). "Utvikling av oppdrett-og bruk av berggylte i lakseoppdrett til kontinuerlig kontroll med lakselus – forlengelse av prosjekt 180028", translation = "Development of aquaculture and use of the ballan wrasse in salmon farming for the continuous control of sea lice - an extension of project # 180,028" (Principal Investigators = Per Gunnar Kvenseth, Anne Berit Skiftesvik, Ingegerd Opstad, Howard Browman). NOK 8 100 000
- 01/2012 – 03/2012 The Research Council of Norway (Industrial Design Award). Designing an inexpensive salmon lice trap. (Principal Investigators = Howard I. Browman, Anne Berit Skiftesvik, David Fields). NOK 250 000

- 01/2008 – 12/2011 The Research Council of Norway. “Cascading effects of climate change and UV envirottoxins on the nutritional quality of the food base in marine ecosystems” (Principal Investigators = Howard Browman, Michael Arts, Ruben Sommaruga, & Caroline Durif). NOK 4 736 000
- 01/2009 – 12/2011 The Research Council of Norway + Bergen Teknologioverføring AS + Institute of Marine Research. “Developing a trap for the control of salmon lice.” (Principal Investigators = Howard Browman, Anne Berit Skiftesvik & David Fields). NOK 1 050 000
- 2011 Fram – High North Research Centre for Climate and the Environment. “Workshop on acidification in aquatic environments: What can marine science learn from limnological studies of acid rain” (Principal Investigators = Howard Browman & Clara Manno). NOK 900 000
- 01/2010 – 12/2011 Institute of Marine Research. “Effect of ocean acidification on *Calanus finmarchicus*, krill, and the early life stages of fish”. (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields, Caroline Durif, V. Thiyagarajan). NOK 1 300 000
- 01/2010 - 12/2010 The Research Council of Norway. “Changes in the *Calanus* complex on both sides of the Atlantic and its possible impact on fish populations” (Principal Investigators = Howard Browman & Anne Berit Skiftesvik). NOK 205 000
- 01/2009 – 12/2010 Institute of Marine Research. “Effects of seismic surveys (air gun blasts) on *Calanus finmarchicus*”. (Principal Investigators: Ingegjerd Opstad, Ørjan Karlsen, Howard Browman, Anne Berit Skiftesvik & David Fields). NOK 622 000
- 01/2006 – 12/2010 Institute of Marine Research. “Sensory Biology and Behaviour of the Early Life Stages of Marine Organisms”. (Principal Investigators: Howard Browman, Anne Berit Skiftesvik, David Fields & Caroline Durif). NOK 14 000 000
- 01/2006 – 12/2008 Research Council of Norway. “Novel narrow bandwidth lighting technology in cod farming and its impact on performance from early stages to adult fish”. (Principal Investigator: Per Åge Lyså + 7 other PIs). NOK 3 800 000
- 01/2004 – 12/2008 The Research Council of Norway. “Magnetoreception and magnetic compass orientation in the long distance migration of the European eel.” (Principal investigators: Asbjørn Vøllestad, Howard Browman, John Phillips, Anne Berit Skiftesvik & Caroline Durif). NOK 4 423 000
- 09/2006 – 12/2007 The Research Council of Norway. “Developing a trap for the control of salmon lice: A proof of concept project.” (Principal Investigators = Howard Browman, David Fields & Anne Berit Skiftesvik). NOK 1 202 000
- 01/2003 – 12/2005 The Research Council of Norway. “The sensory biology of host detection in the parasitic salmon louse, *Lepeophtheirus salmonis*: electrophysiological and behavioural investigations.” (Principal Investigators = Howard Browman, Anne Berit Skiftesvik, Karin Boxaspen, Mark Weissburg, David Fields). NOK 2 550 000
- 01/2002 – 12/2004 The Research Council of Norway. “The role of olfaction in the foraging and prey search behaviour of marine fish larvae”. (Principal Investigators = Howard Browman, Anne Berit Skiftesvik, Syed Yahiya Yacoob). NOK 2 100 000
- 07/2002 – 12/2003 European Union Fifth Framework Program. “Larval Fish Conference”. (Principal investigator = Howard Browman). Euro 58.724.00
- 01/2001 -- 12/2003 The Research Council of Norway. “The effect of an environmental stressor on immune system function, growth and survival in salmon.” (Principal Investigators = Howard Browman, Ilmari Jokinen and Michael Arts). NOK 2 758 000

01/2001 -- 12/2003	The Research Council of Norway. "The effect of environmental factors on viability of great scallop larvae: assessment of feeding and behaviour." (Principal investigators = Sissel Andersen, Howard Browman and Anne Berit Skiftesvik). NOK 2 100 000
01/2002 – 12/2002	The Research Council of Norway. "Developmental Neurobiology and Sensory Biology of Fishes Workshop" (held in conjunction with the 26 th Annual Larval Fish Conference). (Principal investigators = Thomas Becker and Howard Browman). NOK 50 000
2002	Norwegian Institute of Marine Research. Equipment Grant for a microspectrophotometer. NOK 400 000
07/2002	Norwegian Ministry of Foreign Affairs. "Larval Fish Conference". (Principal Investigator: Howard Browman). 47 000 NOK
07/2002	Norwegian Agency for Development Cooperation (NORAD). "Larval Fish Conference". (Principal Investigator: Howard Browman). 97 500 NOK
07/2002	Norwegian Institute of Marine Research. "Larval Fish Conference". (Principal Investigator: Howard Browman). 115 000 NOK
01/2000 -- 12/2002	The Research Council of Norway. "Larval Fish Conference". (Principal investigators = Howard Browman and Anne Berit Skiftesvik). NOK 150 000
01/2000 – 12/2002	The Research Council of Norway. "Sensory biology and behaviour studies of salmon lice nauplii and copepodids." (Principal Investigators = Anne Berit Skiftesvik, Howard Browman and Karin Boxaspen). NOK 1 950 000
01/99 - 12/2002	The Research Council of Norway. "The role of polarized light and polarization vision in the foraging and prey search behaviour of marine fish larvae." NOK 2 286 350
2001	Norwegian Institute of Marine Research. Equipment Grant for an electrophysiology system. NOK 1 000 000
04/97 - 03/1999	High Priority Research Funds, Department of Fisheries and Oceans Canada. "Changes in the atmosphere-ocean flux of solar ultraviolet radiation and its impacts on the early life stages of crustaceans and fish." [Co-Investigator = J.A. Runge] CAD* 165 000
04/95 - 03/99	Individual Grants Program, Natural Sciences and Engineering Research Council of Canada, "Effects of solar ultraviolet radiation, maternal condition, egg quality and temperature on the survivorship, growth and feeding performance of cod larvae". CAD 36 800
04/94 - 03/98	St. Lawrence Action Plan 2000, Department of Fisheries and Oceans Canada. "Ultraviolet radiation in the Estuary and Gulf of St. Lawrence: Monitoring and impact assessment." [Co-Investigator = J.A. Runge]. CAD 220 000
04/93 - 03/98	Department of Fisheries and Oceans Canada. "The role of predator-prey interactions in recruitment processes in the Gulf of St. Lawrence: feeding behaviour and growth of cod larvae." [Co-Investigator = J.A. Runge]. CAD 125 000
1997	Norwegian Institute of Marine Research. Software Development Grant for enhancements to larval fish movement and behavioural analysis system. NOK 50 000
1997	Norwegian Institute of Marine Research. Equipment Grant for a submersible scanning spectroradiometer. NOK 600 000
1997	Norwegian Institute of Marine Research. Equipment Grant for a silhouette video photography behavioural observation platform & computer-based motion analysis system. NOK 300 000

- 04/93 - 03/97 Multidisciplinary Cod Program, Department of Fisheries and Oceans Canada. "The effects of female condition, temperature and egg quality on the survivorship, growth and feeding performance of cod larvae". CAD 80 000
- 1994/95 St. Lawrence Action Plan 2000, Department of Fisheries and Oceans Canada. Equipment Grant for a submersible ultraviolet-optimized scanning spectroradiometer and a solar simulator with incubation/irradiation chamber. CAD 220 000
- 1993/94 Multidisciplinary Cod Program, Department of Fisheries and Oceans Canada. Infrastructure Grant for a fish larval rearing facility. CAD 60 000.
- 1993/94 Multidisciplinary Cod Program, Department of Fisheries and Oceans Canada. Equipment and Software Development Grant for a silhouette video photography behavioural observation platform and computer-based motion analysis system. CAD 85 000.
- 07/93 La Fondation de l'Université du Québec à Montréal. "The role of visual information in the initiation and control of locomotion in the lamprey." CAD 30 000 (declined).
- 11/92 - 01/93 U.S. National Science Foundation, Conference Support Program (Sensory Systems Panel). "The Biology of Ultraviolet Light Reception." USD 5 000 (with T. Cronin & C.W. Hawryshyn).
- 11/92 - 01/93 Medical Research Council of Canada, Conference Support Program. "The Biology of Ultraviolet Light Reception." CAD 2 500. (with C.W. Hawryshyn).
- 11/92 - 01/93 Natural Sciences and Engineering Research Council of Canada, Conference Support Program. "The Biology of Ultraviolet Light Reception." CAD 6 000. (with C.W. Hawryshyn).
- 09/90 - 09/93 Medical Research Council of Canada. "Neuroethological and Developmental Aspects of Ultraviolet Light Reception in Fishes." CAD 98 000
- 05/90 NATO, Scientific Affairs Division. Travel Award for participation in an Advanced Study Institute on the Development and Ageing of the Vertebrate Visual System. CAD 1 800
- 05 - 07/90 Huntsman Marine Science Centre. "Neuroethological Aspects of Foraging and Prey Search Behaviour in Three Species of Marine Fishes." CAD 2 500
- 09/89 - 08/90 The Hamilton Foundation of Canada. "Behavioural and Morphological Aspects of Visual Development in Fishes." CAD 41 000.
- 04/89 Québec Fonds pour la Formation de Chercheurs et l'Aide à la Recherche. "Behavioural and Morphological Aspects of Visual Development in Fishes." CAD 75 000 over three years (declined).
- 05/89 Department of Fisheries and Oceans Canada. "Behavioural Ecology of Ichthyoplankton-Zooplankton Interactions in the St. Lawrence River Estuary." CAD 100 000 over three years (declined).
- 03/88 - 02/90 U.S. National Science Foundation, Ecology Program. "Environmental and Behavioral Effects on the Feeding Ecology of Two Planktivorous Fishes." USD 160 000 [Lead Scientist = W. John O'Brien].
- 08/88 - 05/89 Government of Québec, Ministry of Higher Education and Science. "Behavioral Ecology of Foraging: Ontogenetic and Neuroethological Perspectives." CAD 10 000.

07/87 - 06/88	General Research Funds Program, University of Kansas. "The Role of a Newly Discovered Search Strategy in Vigilance for Predators and Schooling in a Planktivorous Fish." USD 5 200 [Lead Scientist = W.J. O'Brien]
10/86 - 06/87	Biomedical Sciences Research Grant, University of Kansas. "Ontogeny of the Retina and Acquisition of Foraging Skills in the Golden Shiner (<i>Notemigonus crysoleucas</i>)." USD 5 000 [Lead Scientist = W.J. O'Brien]
08/85 - 08/88	Natural Sciences and Engineering Research Council of Canada. "Behavioral Ecology of Foraging: Ontogenetic and Neuroethological Perspectives." CAD 40 000
08/85	United Kingdom and Commonwealth's Overseas Research Student Award. "Visual and Behavioural Development in Marine Fishes", with John H.S. Blaxter. CAD 24 000 over three years (declined).
06/83 - 09/84	McGill University, Faculty of Graduate Studies and Research. "Feeding Behaviour in Fry of Atlantic Salmon." CAD 5 000

PUBLICATIONS

Google Scholar citation analysis results at 22 December 2017: 4383 cites; h-index = 37; i10 index = 80

Publications in peer-reviewed journals

- BROWMAN, H.I. & B.M. Marcotte. 1986. Diurnal feeding activity and prey size selection in Atlantic salmon (*Salmo salar*) alevins. *Developments in Environmental Biology of Fishes* 7: 269-284.
- Marcotte, B.M. & H.I. BROWMAN. 1986. Foraging behaviour in fishes: perspectives on variance. *Environmental Biology of Fishes* 16: 25-33.
- Reiswig, H.M. & H.I. BROWMAN. 1987. The use of membrane filters for microscope preparations of sponge spicules. *Transactions of the American Microscopical Society* 106: 10-20.
- BROWMAN, H.I. & B.M. Marcotte. 1987. Effects of prey color and background color on feeding by Atlantic salmon alevins. *Progressive Fish-Culturist* 49: 140-143.
- BROWMAN, H.I. & B.M. Marcotte. 1987. The effect of zooplankton abundance on feeding behaviour and prey size selection in Atlantic salmon (*Salmo salar*) alevins. *Ecography* 10: 163-170.
- O'Brien, W.J., B.I. Evans & H.I. BROWMAN. 1989. Flexible search tactics and efficient foraging in saltatory searching animals. *Oecologia* 80: 100-110.
- BROWMAN, H.I., S. Kruse & W.J. O'Brien. 1989. Foraging behavior of the predaceous cladoceran, *Leptodora kindtii*, and escape responses of their prey. *Journal of Plankton Research* 11: 1075-1088.
- BROWMAN, H.I. 1989. The embryology, ethology and ecology of ontogenetic critical periods in fishes. *Brain, Behavior and Evolution* 34: 5-12.
- BROWMAN, H.I. 1989. Functional development of sensory systems and acquisition of behaviour in fish larvae. *Brain, Behavior and Evolution*. 34: 4.
- O'Brien, W.J., H.I. BROWMAN & B.I. Evans. 1990. Search strategies of foraging animals. *American Scientist* 78: 152-160.
- BROWMAN, H.I., W.C. Gordon, B.I. Evans & W.J. O'Brien. 1990. Correlation between histological and behavioral measures of visual acuity in a zooplanktivorous fish, the white crappie (*Pomoxis annularis*). *Brain, Behavior and Evolution* 35: 85-97. [cover article]
- BROWMAN, H.I. & W.J. O'Brien. 1992. Foraging and search behaviour of golden shiner (*Notemigonus crysoleucas*) larvae. *Canadian Journal of Fisheries and Aquatic Sciences* 49: 813-819.
- BROWMAN, H.I. & W.J. O'Brien. 1992. The ontogeny of search behaviour in the white crappie, *Pomoxis annularis*. *Environmental Biology of Fishes* 34: 181-195.
- BROWMAN, H.I. & C.W. Hawryshyn. 1992. Thyroxine induces a precocial loss of ultraviolet photosensitivity in rainbow trout (*Oncorhynchus mykiss*). *Vision Research* 32: 2303-2312.
- Beaudet, L., H.I. BROWMAN & C.W. Hawryshyn. 1993. Optic nerve response and retinal structure in rainbow trout of different sizes. *Vision Research* 33: 1739-1746. [cover article]
- BROWMAN, H.I., I. Novales-Flamarique & C.W. Hawryshyn. 1994. Ultraviolet photoreception contributes to prey search behaviour in two species of zooplanktivorous fishes. *Journal of Experimental Biology* 186: 187-198.

17. BROWMAN, H.I. & C.W. Hawryshyn. 1994. The developmental trajectory of ultraviolet photosensitivity in rainbow trout is altered by thyroxine. *Vision Research* 34: 1397-1406. [cover article]
18. BROWMAN, H.I. & C.W. Hawryshyn. 1994. Retinoic acid modulates retinal development in the juveniles of a teleost fish. *Journal of Experimental Biology* 193: 191-207. [cover article]
19. BROWMAN, H.I. 1995. Commentaries on current trends in recruitment studies. *Marine Ecology Progress Series*. 128: 305.
20. BROWMAN, H.I. 1996. Effets des UVB sur les ressources marines. *Canadian Meteorological and Oceanographic Society Bulletin* 24 (1): 1-2.
21. BROWMAN, H.I. 1996. L'augmentation du rayonnement ultraviolet B peut-elle avoir des incidences négatives sur les ressources marines dans le golfe du Saint-Laurent? *Le Naturaliste Canadien* 120: 66-68.
22. BROWMAN, H.I. & A.B. Skiftesvik. 1996. The effects of turbulence on the predation cycle of fish larvae: comments on some of the issues. *Marine Ecology Progress Series* 139: 309-312.
23. BROWMAN, H.I. 1996. Predator-prey interactions in the sea. Commentaries on the role of turbulence. *Marine Ecology Progress Series*. 139: 301-302.
24. Kuhn, P., H.I. BROWMAN, B. McArthur & J.-F. St-Pierre. 1999. Penetration of ultraviolet radiation in the waters of the estuary and Gulf of St. Lawrence. *Limnology and Oceanography* 44: 710-716.
25. Kouwenberg, J.H.M., H.I. BROWMAN, J.J. Cullen, R.F. Davis, J.-F. St-Pierre & J.A. Runge. 1999. Biological weighting of ultraviolet (280-400 nm) induced mortality in marine zooplankton and fish. I. Atlantic cod (*Gadus morhua*) eggs. *Marine Biology* 134: 269-284.
26. Kouwenberg, J.H.M., H.I. BROWMAN, J.A. Runge, J.J. Cullen, R.F. Davis, J.-F. St-Pierre. 1999. Biological weighting of ultraviolet (280-400 nm) induced mortality in marine zooplankton and fish. II. *Calanus finmarchicus* eggs. *Marine Biology* 134: 285-293.
27. Béland, F., H.I. BROWMAN, C. Alonso Rodriguez & J.-F. St-Pierre. 1999. The effect of solar ultraviolet radiation (280 - 400 nm) on the eggs and larvae of Atlantic cod (*Gadus morhua*). *Canadian Journal of Fisheries and Aquatic Sciences* 56: 1058-1067.
28. BROWMAN, H.I. 1999. The uncertain position, status and impact of negative results in marine ecology: philosophical and practical considerations. *Marine Ecology Progress Series*. 191: 301-302.
29. Alonso Rodriguez, C., H.I. BROWMAN, J.A. Runge & J.-F. St-Pierre. 2000. Impact of solar ultraviolet radiation on hatching of a marine copepod, *Calanus finmarchicus*. *Marine Ecology Progress Series* 193: 85-93.
30. Alonso Rodriguez, C. & H.I. BROWMAN. 2000. High survival of neustonic zoea I larvae of American lobster (*Homarus americanus*) following short-term exposure to ultraviolet radiation (280 to 400 nm). *Marine Ecology Progress Series* 193: 305-309.
31. Novales Flamarique, I., H.I. BROWMAN, M. Bélanger & K. Boxaspen. 2000. Ontogenetic changes in visual responses of the parasitic salmon louse, *Lepeoptheirus salmonis*. *Journal of Experimental Biology* 203: 1649-1657.
32. BROWMAN, H.I., C. Alonso Rodriguez, F. Béland, J.J. Cullen, R.F. Davis, J.H.M. Kouwenberg, P. Kuhn, B. McArthur, J.A. Runge, J.-F. St-Pierre, & R.D. Vetter. 2000. The impact of ultraviolet radiation on marine crustacean zooplankton and ichthyoplankton: a synthesis of results from the estuary and Gulf of St. Lawrence, Canada. *Marine Ecology Progress Series* 199: 293-311.
33. Kuhn, P., H.I. BROWMAN, R.F. Davis, J.J. Cullen & B. McArthur. 2000. Modelling the effects of ultraviolet radiation on early life history stages of *Calanus finmarchicus* and Atlantic cod (*Gadus morhua*) in a mixing environment. *Limnology and Oceanography* 45: 1797-1806.
34. Novales Flamarique, I. & H.I. BROWMAN. 2000. Wavelength-dependent polarization orientation in *Daphnia*. *Journal of Comparative Physiology A* 186: 1073-1087.
35. BROWMAN, H.I. 2000. Application of evolutionary theory to fishery science and stock assessment-management. *Marine Ecology Progress Series*. 208: 299.
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28. Gibbs, M. & H.I. BROWMAN (Eds.). 2015. Risk assessment in marine science. *ICES Journal of Marine Science* 72(3): 992-1132.
29. Sathyendranath, S., R. Ji & H.I. BROWMAN (Eds.). 2015. Revisiting Sverdrup's critical depth hypothesis. *ICES Journal of Marine Science* 72(6): 1892-2071.
30. BROWMAN, H.I. (Ed.) 2016. Towards a broader perspective on ocean acidification research. *ICES Journal of Marine Science* 73(3).
31. Hidalgo, M, D.H. Secor & H.I. BROWMAN (Eds). 2016. Seascape Ecology. *ICES Journal of Marine Science* 73(7): 1825-1945.
32. Link, J. & H.I. BROWMAN. 2017. Case studies in operationalizing ecosystem-based management. *ICES Journal of Marine Science*. 74(1): 379-452.
33. BROWMAN, H.I. (Ed.) 2017. Towards a broader perspective on ocean acidification research - Part 2. *ICES Journal of Marine Science* 74(4).
34. Hidalgo, M., C.B. Paris, J. Watson, D.M. Kaplan & H.I. BROWMAN (Eds.). 2017. Beyond ocean connectivity: new frontiers in early life stages and adult connectivity to meet assessment and management challenges. *ICES Journal of Marine Science* 74(6). 1702-1837.
35. Pendleton, L., G. Ahmadi, H.I. BROWMAN, R. Thurstan, D.M. Kaplan & V. Bartolino (Eds.). 2017. Debating the effectiveness of marine protected areas. *ICES Journal of Marine Science* 74(7): (in press).

Chapters in peer-reviewed books

1. BROWMAN, H.I. & R.D. Vetter. 2001. The Impact of Solar Ultraviolet Radiation on Crustacean Zooplankton and Ichthyoplankton: Case Studies from Sub-Arctic Marine Ecosystems. Pp: 261-304, In: D.O. Hessen (Ed.). *UV-Radiation and Arctic Ecosystems*. Springer-Verlag.
2. BROWMAN, H.I., J.-F. St-Pierre, A.B. Skiftesvik & R.G. Racca. 2003. Behaviour of Atlantic cod (*Gadus morhua*) larvae: an attempt to link maternal condition with larval quality, pp: 71-95, In: H.I. Browman and A.B. Skiftesvik (Eds.). *The Big Fish Bang. Proceedings of the 26th Annual Larval Fish Conference*.
3. Skiftesvik, A.B., H.I. BROWMAN & J.-F. St-Pierre. 2003. Life in green water: the effect of microalgae on the behaviour of Atlantic cod (*Gadus morhua*) larvae, pp: 97-103, In: H.I. Browman and A.B. Skiftesvik (Eds.). *The Big Fish Bang. Proceedings of the 26th Annual Larval Fish Conference*.
4. Evans, B.I. & H.I. BROWMAN. 2004. Variation in the development of the fish retina, pp: 145-166, In: J.J. Govoni (Ed.). *Development of Form and Function in Fishes, and the Question of Larval Adaptation*. American Fisheries Society Symposium # 40.
5. Kruse, G.H., H.I. BROWMAN, K.L. Cochrane, D. Evans, W.J. Fletcher, G.S. Jamieson, P.A. Livingston, D. Woodby, and C.I. Zhang (Eds.) 2012. Steps for future progress in ecosystem-based fisheries management: what's next? Pp: 375-380, In, Kruse, G.H., H.I. BROWMAN, K.L. Cochrane, D. Evans, W.J. Fletcher, G.S. Jamieson, P.A. Livingston, D. Woodby, and C.I. Zhang (Eds.) 2012. *Global progress in ecosystem-based fisheries management*. Alaska Sea Grant, University of Alaska Fairbanks. 396 p., doi:10.4027/gpebfm.2012.019.

Institutional reports and scientific opinions

1. Vaughan, H., J. Carey, R. Bukata, H. BROWMAN, M. Morrison, K. Percy, R. Robarts and F. Crisp. 1997. Addressing the Ecosystem Effects of Ultraviolet Radiation Including an Inventory of Research and Collaborative Mechanisms: Report of the Working Group on the Ecosystem Effects of Ultraviolet Radiation convened under the Memorandum of Understanding on Science and Technology for Sustainable Development in the Natural Resources Sector. Government of Canada, Environment Canada, National Water Research Institute, Burlington, Ontario, Canada. 77 pages.
2. Dutil, J.-D., M. Castonguay, M.O. Hammill, P. Ouellet, Y. Lambert, D. Chabot, H. BROWMAN, D. Gilbert, A. Fréchet, J.-A. Gagné, D. Gascon & L. Savard. 1998. Environmental influences on the productivity of cod stocks: some evidence for the northern Gulf of St. Lawrence, and required changes in management practices. *Department of Fisheries and Oceans (Canada)*. [Atlantic Fisheries Research Document 98/18](#): 42p.
3. BROWMAN, H.I. 2001. Asking fish larvae what they see and smell. Pp: 70-71 In Olsen, R.E. and Hansen, T. (Eds.). *Havbruksrapporten 2001. Fisken og havet, særnr. 3-2001*.
4. BROWMAN, H. 2004. Sansebiologi og atferd – viktig kunnskap for utvikling av marint oppdrett. Pp. 77-78, In Agnalt, A, Ervik, A., Kristiansen, T.S. & Oppedal, F. (Eds.). *Havbruksrapport 2004. Fisken of havet, saernr. 3-2004*.
5. Irisson, J-O, J.M. Leis, C. Paris & H.I. BROWMAN. 2009. Behaviour and settlement, pp: 42-59, In: North, E.W., A. Gallego, and P. Petitgas (eds.). *Manual of recommended practices for modelling physical-biological interactions during fish early life*. [ICES Cooperative Research Report No. 295](#).
6. BROWMAN, H.I., A.B. Skiftesvik & T. van der Meeren. 2009. Behaviour. pp: 23-26, In: Helvik, J.V. et al. 2009. [The fish larva: a transitional life form, the foundation for aquaculture and fisheries. Report from a working group on research on early life stages of fish](#). The Research Council of Norway, Oslo.
7. EFSA Panel on Animal Health and Welfare (AHAW). 2013. Scientific Opinion on the electrical parameters for the stunning of lambs and kid goats. *EFSA Journal* 2013;11(6):3249. [40 pp.] doi:10.2903/j.efsa.2013.3249. (Chair of the Working Group)
8. EFSA Panel on Animal Health and Welfare (AHAW). 2013. Scientific Opinion on the use of carbon dioxide for stunning rabbits. *EFSA Journal* 2013; 11(6):3250. [33 pp.] doi:10.2903/j.efsa.2013.3250. (Chair of the Working Group)
9. Bellerby, R.G., H.I. BROWMAN & R. Sumaila. 2013. [AMAP Assessment 2013: Arctic Ocean Acidification](#). Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. viii + 99 pp.
10. BROWMAN, H.I., S. Dupont, J. Havenhand & L. Robbins. 2013. Biological responses to ocean acidification. Pp: 37-54, In: Bellerby, R.G., H.I. BROWMAN, R. Sumaila et al. 2013. *Impacts of ocean acidification in the Arctic ocean*. Arctic Monitoring and Assessment Program, Arctic Ocean Acidification Assessment, Oslo.
11. EFSA Panel on Animal Health and Welfare (AHAW). 2013. Guidance on the assessment criteria for studies evaluating the effectiveness of stunning interventions regarding animal protection at the time of

- killing. EFSA Journal 2013;11(12):3486, 41 pp. doi:10.2903/j.efsa.2013.3486. (Chair of the Working Group)
12. EFSA Panel on Animal Health and Welfare (AHAW). 2014. Scientific Opinion on the use of low atmosphere pressure system (LAPS) for stunning poultry. EFSA Journal 2014;12(1):3488, 27 pp. doi:10.2903/j.efsa.2014.3488. (Chair of the Working Group)
 13. Thor, P., H.I. BROWMAN & C. Halsband. 2014. Ocean acidification – CO₂ effects in northern waters. *Fram Forum* 2014: 40-43.
 14. EFSA Panel on Animal Health and Welfare (AHAW). 2014. Scientific Opinion on electrical requirements for poultry waterbath stunning equipment. EFSA Journal 2014;12(7):3745, 408 pp. doi:10.2903/j.efsa.2014.3745 (Chair of the Working Group).
 15. EFSA Panel on Animal Health and Welfare (AHAW). 2015. Scientific Opinion on the scientific assessment of studies on electrical parameters for stunning of small ruminants (ovine and caprine species). EFSA Journal 2015;13(2):4023, 15 pp. doi:10.2903/j.efsa.2015.4023. (Member of the Working Group).
 16. EFSA Panel on Animal Health and Welfare (AHAW). 2015. Scientific Opinion on the assessment of studies on the use of carbon dioxide for stunning rabbits. EFSA Journal 2015;13(2):4022, 27 pp. doi:10.2903/j.efsa.2015.4022. (Member of the Working Group).
 17. EFSA Panel on Animal Health and Welfare (AHAW). 2015. Scientific opinion on oyster mortality. EFSA Journal 2015;13(6):4122, 59 pp. doi:10.2903/j.efsa.2015.4122 (Chair of the Working Group).
 18. EFSA Panel on Animal Health and Welfare (AHAW). 2016. Scientific opinion on assessing the health status of managed honeybee colonies (HEALTHY-B): a toolbox to facilitate harmonised data collection. EFSA Journal 2016; 14(10):4578, 241 pp. doi: 10.2903/j.efsa.2016.4578 (Member of the Working Group).
 19. Loew, E.R., A.B. Skiftesvik, R. Bjelland, H.I. BROWMAN & C. Durif. 2016. Spectral sensitivity and contrast potentials for four species of cleaner fish. Institute of Marine Research Report No. 39-2016. 12 pp.

Book reviews

- Hawryshyn, C.W. & H.I. BROWMAN. 1993. Book review of: *P.J. Herring, A.K. Campbell, M. Whitfield, & L. Maddock (Eds.). 1990. Light and Life in the Sea. Environmental Biology of Fishes* 36: 103-104.
- BROWMAN, H.I. 1995. Environmental (habitat?) quality, contaminants, toxins and fish larvae. Book review of: *Fuiman, L.A. (Ed.). 1993. Water Quality and the Early Life Stages of Fishes. Environmental Biology of Fishes* 44: 423-424.

Theses and dissertations

- BROWMAN, H.I. 1981. Prediction of Egg Mortality in Capelin (*Mallotus villosus*) From Meteorological, Hydrographic and Biological Factors. B.Sc. Thesis [Major advisors: William C. Leggett and Kenneth T. Frank].
- BROWMAN, H.I. 1982. Skeletal Structures of Hexactinellid Sponges - A Scanning Electron Microscope Study. B.Sc. Thesis [Major advisor: Henry M. Reiswig].
- BROWMAN, H.I. 1985. Feeding Behaviour in Fry of Atlantic salmon, *Salmo salar* L. (129 pp) M.Sc. Thesis [Major advisor: Brian M. Marcotte].
- BROWMAN, H.I. 1989. Behavioral Ecology of Foraging in a Zooplanktivorous Fish, *Pomoxis annularis*, and a Predaceous Invertebrate, *Leptodora kindtii*: Ontogenetic and Neuroethological Perspectives. (169 pp) Ph.D. Dissertation [Major advisor: W. John O'Brien].

Publications in preparation

- Bjelland, R.M., Opstad, O., Skiftesvik, A.B. & H.I. BROWMAN. Comparison of behaviour, growth and gut enzyme activity in the early life stages of cod (*Gadus morhua* L.) and haddock (*Melanogrammus aeglefinus* L.).
- Bjelland, R.M., Skiftesvik, A.B. & H.I. BROWMAN. Behavioural responses of larval cod (*Gadus morhua* L.) and haddock (*Melanogrammus aeglefinus* L.) to odours.
- BROWMAN, H.I. & A.B. Skiftesvik. The internal and external ecologies of critical periods.
- BROWMAN, H.I., J. Forsell, E.R. Loew, P. Ekstrom & B. Holmqvist. Spatiotemporal differentiation of ultraviolet opsin expressing cells in the developing retina of Atlantic salmon (*Salmo salar*).
- Cresci, A, C.B. Paris, C.M.F. Durif, S. Shema, R. Bjelland, A.B. Skiftesvik & H.I. BROWMAN. Glass eels (*Anguilla anguilla*) orientation is correlated with the position of the moon, even when they cannot see it.

- Cresci, A, C.B. Paris, C.M.F. Durif, S. Shema, R. Bjelland, A.B. Skiftesvik & H.I. BROWMAN. Orientation of European glass eels (*Anguilla anguilla*) arriving at the Norwegian coast.
- Cresci, A, C.B. Paris, C.M.F. Durif, S. Shema, R. Bjelland, A.B. Skiftesvik & H.I. BROWMAN. The magnetic compass of glass eel (*Anguilla anguilla*) is entrained to and modulated by the tidal cycle.
- Cresci, A., C.B. Paris, S. Shema, A.B. Skiftesvik & H.I. BROWMAN. Ontogeny of swimming and orientation in saithe (*Pollachius virens*) larvae *in situ*.
- Cresci, A, B.J.M. Allan, S. Shema, A.B. Skiftesvik & H.I. BROWMAN. Ontogeny of swimming and orientation in Atlantic herring (*Clupea harengus*) larvae *in situ*.
- Dineshran, R., V. Thiyagarajan, D.M. Fields, J.A. Runge, C. Thompson, S. Shema, R.M. Bjelland, C.M.F. Durif, A.B. Skiftesvik & H.I. BROWMAN. The proteome of *Calanus finmarchicus* is unaffected by elevated pCO₂.
- Durif, C.M.F., A.B. Skiftesvik, R.M. Bjelland & H.I. BROWMAN. Population estimates for several species of wrasse in Norway using mark-recapture techniques.
- Durif, C.M.F., A.B. Skiftesvik & H.I. BROWMAN. Marine vs. freshwater residency of European eels during the on-growing life history stages.
- Fields, D.M., H.I. BROWMAN, A.B. Skiftesvik & S. Shema. Effect of ocean acidification on the grazing rates of *Calanus spp.* feeding on lithed and delithed coccolithophores.
- Fields, D.M., H.I. BROWMAN, A.B. Skiftesvik & S. Shema. Temperature effects on metabolic rate of *Calanus spp.*
- Fields, D.M., H.I. BROWMAN & B. Twining. Copepods as 10²¹ ocean bioreactors.
- Paris, C.B., H.I. BROWMAN, A.B. Skiftesvik, S. Shema, M. Foretich, C.J. O'Brien, A. Cresci, R.M. Bjelland, C.M.F. Durif & F. Vikebø. Ontogeny of swimming and orientation in Atlantic haddock (*Melanogrammus aeglefinus*) larvae measured *in situ* and in the laboratory.
- Paris, C.B., H.I. BROWMAN, A.B. Skiftesvik, S. Shema, M. Foretich, C.J. O'Brien, A. Cresci, R.M. Bjelland, C.M.F. Durif, F. Vikebø. & S. Meier. Effect of exposure to petrochemicals on swimming and orientation of Atlantic haddock (*Melanogrammus aeglefinus*) larvae measured *in situ* and in the laboratory.
- Rice, J. & H.I. BROWMAN. What Humpty Dumpty means when he says, "ecosystem approach".
- Runge, J.A., D.M. Fields, C. Thompson, C.M.F. Durif, S. Shema, R.M. Bjelland, A.B. Skiftesvik and H.I. BROWMAN. Interaction between temperature and pH on growth and respiration of the planktonic copepod, *Calanus finmarchicus*. ICES Journal of Marine Science.
- Skiftesvik, A.B., C.M.F. Durif, R.M. Bjelland & H.I. BROWMAN. Population dynamics of several species of wrasse in Norway.
- Skiftesvik, A.B., C.M.F. Durif, R.M. Bjelland & H.I. BROWMAN. Behaviour and interactions between different species of cleanerfish in salmon aquaculture net pens.
- Skiftesvik, A.B., C.M.F. Durif, R.M. Bjelland, E.R. Loew & H.I. BROWMAN. Retinal spectral sensitivity and the effect of artificial lighting on the delousing efficiency of wrasse in sea cages.
- Skiftesvik, A.B., C.M.F. Durif, R.M. Bjelland & H.I. BROWMAN. Species distribution and habitat of wrasse along the Norwegian coast.
- Skiftesvik, A.B., C.M.F. Durif, R.M. Bjelland & H.I. BROWMAN. Effect of fishing pressure on age, growth and species composition of wrasse along the Norwegian coast, 1990-present day.
- Thompson, C. J.A. Runge, D.M. Fields, S. Shema, R.M. Bjelland, C.M.F. Durif, A.B. Skiftesvik, M. Arts, A. Mount, V. Chan & H.I. BROWMAN. Vital rates of the salmon louse, *Lepeophtheirus salmonis*, are unaffected by high CO₂ but are affected by temperature.

POPULARIZING OF RESEARCH AND OUTREACH

Graphics published on the covers of journals

Brain, Behavior and Evolution 35(2), 1990
American Scientist 80(2), March/April, 1992
Vision Research 33(13), September, 1993
Vision Research 34(11), June, 1994
Journal of Experimental Biology 193, August 1994

Promotional posters (commissioned and/or designed)

[Ultraviolet-polarized light vision symposium](#)
[26th Annual Larval Fish Conference](#)
[36th Annual Larval Fish Conference](#)

[The Future is Coming at You](#)
[Gadus morhua Forever](#)
[IMR-Austevoll 25th Anniversary](#)
[Theme image for the Early Life History Section of the American Fisheries Society](#)

Online publishing (web site content)

2010- Motivator for the development of, author of content, and webmaster for www.fishlarvae.org

2010-2015 Motivator for the development of, co-author of content, and webmaster for www.larvalfishcon.org

Articles about our research in the mass media

See [HERE](#).

Designing improved feeds for marine fish larvae is an article on our work (by freelance journalist Jens Kyed) appearing in the January/February 2003 issue of the trade magazine Hatchery International.

Micro-diet research held up because of lack of funding is an article on our work (by freelance journalist Bernadette Tournay) appearing in the 1 December 2006 issue of the trade magazine Fish Farming International.

Det ål-timate navigasjonssystemet is a popular article about our eel navigation project appearing in March 2010 in Forskning.no and picked up by several national newspapers.

Skiftesvik, A.B., Bjelland, R.M., Durif, C. & Browman, H. (2013). Er oppdrettede berggyllt så gode luseplukkere som villfanget leppefisk? Norsk Fiskeoppdrett 8: 87-90.

Skiftesvik, A.B., Durif, C., Bjelland, R.M. & Browman, H. (2013). Alder og vekst hos vill leppefisk. Norsk Fiskeoppdrett 8: 91-94.

Skiftesvik, A.B., Durif, C., Bjelland, R.M. & Browman, H. (2013). Leppefisk og leveområder. Norsk Fiskeoppdrett 8: 95-98.

Skiftesvik, A.B. & C.M.F. Durif (2014). Ålen finner veien med egen GPS. Bergens Tidende, 7 September 2014.

Glass eels: see-through, slippery and guided by magnetism and tides. [New York Times](#), 9 June 2017.

Ålen finn fram ved hjelp av eit indre kompass. Forskning.no, 12 June 2017

Television and radio coverage of our research

1997: Canadian Broadcasting Corporation: radio interview about ultraviolet radiation research.

2002: Skrodinger's Kat (Norwegian science show): story on salmon lice research.

2004: German science documentary on aquaculture research.

2012: "Kjenner lusa på gangen" – video about our lice trap development project in cooperation with [Eker Design](#) and the [Norwegian Design Council](#) presented by Bård Eker at [Norwegian Design Day 2012](#).

2013: [Arctic ocean acidification](#) – expert contributor to video documentary produced as a summary of the Arctic Monitoring and Assessment Program's Arctic Ocean Acidification Assessment.

2017: Ålen finn fram ved hjelp av eit indre kompass. Norwegian Radio 2 interview with Anne Berit Skiftesvik

TEACHING

Courses, lectures and workshops

- | | |
|-------|---|
| 05/18 | Workshop leader and lecturer, "Scientific writing and publishing workshop". Institute of Marine Research, Bergen, Norway |
| 11/17 | Workshop leader and lecturer, "Scientific writing and publishing workshop". Greenland Institute of Natural Resources, Nuuk, Greenland |
| 01/17 | Lecturer (ethics and morals of animal use in research and elsewhere), Laboratory Animal Science course. University of Bergen, Norway – lecture delivered twice per year in the required course on animal use in research (since 2008) |

- 11/16 Lecturer (ethics and morals of animal use in research and elsewhere), Laboratory Animal Science course. Norwegian University of Science and Technology, Trondheim, Norway - lecture delivered every year in the required course on animal use in research (since 2014)
- 09/16 Lecturer, "Getting published" skills workshop for early career scientists, ICES Annual Science Conference, Riga
- 02/15 Lecturer, "Research Communication". DTU-AQUA, Copenhagen, Denmark
- 03&06/15 Lecturer (ethics and morals of animal use in research and elsewhere), Laboratory Animal Science course. University of Bergen, Norway – lecture delivered twice per year in the required course on animal use in research (since 2008)
- 06/14 Lecturer and co-developer, Workshop on "Scientific writing and publishing", with Professor Jan Pechenik (Tufts University). Institute of Marine Research, Bergen, Norway
- 06/13 Lecturer and panelist, "Ethical challenges related to publications". University of Bergen, Norway
- 06/13 Lecturer and co-developer, Workshop on "Scientific writing and publishing", with Professor Jan Pechenik (Tufts University). Institute of Marine Research, Bergen, Norway
- 12/12 Lecturer and developer, Workshop on "How to write and publish brilliant research papers". University of Hong Kong, School of Biological Sciences
- 05/12 Lecturer and co-developer, Workshop on "How to write and publish brilliant research papers", with Professor Jan Pechenik (Tufts University). World Fisheries Congress, Edinburgh
- 04/12 Lecturer and panelist, Seminar on bibliometry, University of Bergen
- 03/12 Lecturer, Animal behaviour/visual ecology course, Ben-Gurion University of the Negev, Eilat, Israel
- 11/09 Lecturer and co-developer, Workshop on "How to write and publish brilliant research papers", with Professor Jan Pechenik (Tufts University). University of Hong Kong, School of Biological Sciences
- 11/09 Lecturer, Environmental Life Sciences course, University of Hong Kong, School of Biological Sciences
- 08/09 Lecturer in Nordic Marine Academy course, "Nursery ground ecology: methods of study and analysis". Bergen, Norway
- 09/08 Co-Chair of Workshop on "Writing a science paper, ethics and plagiarism", 2nd European Conference on Scientific Publishing in Biomedicine and Medicine, Oslo, Norway
- 11/99 Course Developer and Lecturer -- "Sensory Ecology of Aquatic Crustaceans and Fishes" a one-week graduate course at the Department of Fisheries and Marine Biology, University of Bergen, Norway.
- 10/98 Lecturer in "Parent-Progeny Relationships in Fishes", a doctoral-level course in the Department of Marine Biology and Fisheries, University of Bergen, Norway
- 09/92 - 12/92 Lecturer in "Ichthyology: An Introduction to the Biology of Fishes." [17 week course, 51 lectures, 12 labs, 3 field trips]. University of Victoria
- 02/92 - 03/92 Lecturer in "Advanced Topics in Ichthyology." Series of lectures on the biology and ecology of early life history stages. University of Victoria

11/89 & 10/90	Lecturer in "Ichthyology: An Introduction to the Biology of Fishes." University of Victoria
01 - 05/87 - 89	Laboratory Instructor and Lecturer in "Limnology and Aquatic Ecology." University of Kansas
08/87 - 12/87	Laboratory Instructor in "Stream Ecology." University of Kansas
01/86 - 05/86	Laboratory Instructor in "Principles of Biology." University of Kansas
11/84	Lecturer in "Biological Oceanography." McGill University
04 - 05/84	Lecturer for SEA SEMESTER, an oceanography field course aboard the staysail schooner R/V Westward. Sea Education Association
1983 & 1984	Laboratory Instructor in "Organismal Biology." McGill University
01/83 - 04/83	Laboratory Instructor in "Phycology." McGill University

Postdoctoral associates

2010 – 2012	Dr. Yuichi Fukunishi (currently Researcher, Toyama Prefectural Agricultural, Forestry & Fisheries Research Center , Japan)
2004 – 2011	Dr. Caroline Durif (currently Research Scientist, Institute of Marine Research, Norway)
2002 – 2004	Dr. Syed Yahiya Yacoob (currently Research Associate for a pharmaceutical company in New Zealand)
1997 – 2001	Dr. Iñigo Novales Flamarique (currently Associate Professor, Department of Biology, Simon Fraser University)
1995 – 1997	Dr. Juliana Kouwenberg (currently Researcher, Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam)

Graduate students (supervised or co-supervised)

2017 -	Rosa Helena Escobar (Ph.D., University of Bergen)
2017 -	Gustavo Núñez (Ph.D., University of Concepcion, Chile)
2016 --	Alessandro Cresci (Ph.D., University of Miami)
2013 -- 2017	Allison Bailey (Ph.D. in Biology, University of Tromsø and Norwegian Polar Institute)
2010 -- 2012	Rommel Maneja (Ph.D. in Biology, currently, Postdoctoral Researcher, King Fahd University, Saudi Arabia)
2007 -- 2010	Knut Wiik Vollset (Ph.D. in Biology, currently Senior Researcher, uni Miljø, Bergen)
2003 --	Mari Abrahamsen (Ph.D. in Biology – never completed due to long-term illness)
2001 --	Reidun Bjelland (Ph.D. in Biology – never completed due to change of career)
1999 – 2002	Katrine Skajaa (Ph.D. in Fisheries and Marine Biology, currently Research Scientist with County Governor in Aust-Agder, Department of Environment Protection, Arendal, Norway)
1996 – 1999	Carolina Alonso Rodriguez (Masters in Oceanography, currently Junior Scientist, Foundation AZTI, Spain)
1996 – 1998	France Béland (Masters in Oceanography, currently Research Assistant at the University of Moncton, New Brunswick, Canada)

EDITORIAL, PEER REVIEW AND SCIENTIFIC PUBLISHING

- Editor-in-Chief, [ICES Journal of Marine Science](#), 2012-
- Member, Council (=Board of Directors), Committee on Publication Ethics, 2017-
- Member, Editorial Policy Committee, Council of Science Editors, 2010-
- Member, Committee on Publication Ethics, 2009-
- Member, Council of Science Editors, 2005-
- Member, ICES Publications and Communications Committee, 2012- (ex officio)
- Member, ICES Publications and Communications Committee, 2005-2011

- Section Editor (Marine Ecology), PLOS ONE, 2013-2015
- Member, Publications Overview Committee, American Fisheries Society, 2009-2014
- Member, Publications Committee, Association for the Sciences of Limnology and Oceanography, 2011-2014
- Member, International Advisory Board, Committee on Publication Ethics, 2013-2104
- Academic Editor, PLOS ONE, 2010-2012
- Contributor to the updated edition of the Council of Science Editor's White Paper on Promoting Integrity in Scientific Journal Publications, 2012 Edition, 2011-2012
- Editorial Board Member, Nature Publishing Group, Scientific Reports, 2011-2012
- Science Editor, Fisheries, 2010-2012
- Subject Editor, Marine and Coastal Fisheries, 2008-2011
- Member, Joint Committee on Publication Ethics and Council of Science Editors working group on impact factor manipulation by scientific journals, 2011-2012
- Co-Founder and Associate Editor-in-Chief, *Aquatic Biology*, 2007
- Editor-in-Chief, *Ethics in Science and Environmental Politics*, 2005-2007
- Advisory Editor for all Inter-Research Science Centre publications, 2005-2007
- Associate Editor-in-Chief, *Marine Ecology Progress Series*, 2005-2007
- Contributing Editor, *Marine Ecology Progress Series*, 1996-2004
- Review Editor, *Marine Ecology Progress Series*, 1992-1996

Ad hoc peer review for scholarly journals (72 journals)

• *Advances in Polar Science* • *Aquaculture* • *Aquaculture Research* • *Aquatic Biology* • *Aquatic Ecology* • *Aquatic Sciences* • *Biogeosciences* • *Biology Letters* • *Biomed Central Ecology* • *Biomed Central Developmental Biology* • *Canadian Journal of Fisheries and Aquatic Sciences* • *Canadian Journal of Zoology* • *Conservation Biology* • *Copeia* • *Deep-Sea Research, Part I* • *Deep-Sea Research, Part II* • *Diseases of Aquatic Organisms* • *Earth-Science Reviews* • *Ecological Applications* • *Ecological Modelling* • *Ecology and Evolution* • *Ecology of Freshwater Fish Organisms* • *Ecology Letters* • *Ecosphere* • *Environmental Biology of Fishes* • *Environmental Science and Technology* • *Ethology* • *Environmental Science and Pollution Research* • *F1000 Research* • *Fisheries* • *Fisheries Oceanography* • *Fisheries Research* • *Functional Ecology* • *Hydrobiologia* • *ICES Journal of Marine Science* • *Ichthyological Research* • *Innovative Food Science and Emerging Technologies* • *Journal of Environmental Monitoring* • *Journal of Experimental Biology* • *Journal of Experimental Zoology A* • *Journal of Fish Biology* • *Journal of the Brazilian Academy of Sciences* • *Journal of Thermal Biology* • *Journal of the Royal Society Interface* • *Limnology and Oceanography* • *Limnology and Oceanography – Methods* • *Lipids* • *Marine and Coastal Fisheries* • *Marine and Freshwater Behaviour and Physiology* • *Marine and Freshwater Research* • *Marine Biology* • *Marine Biology Research* • *Marine Ecology Progress Series* • *Marine Pollution Bulletin* • *Micron* • *Nature Climate Change* • *Parasites and Vectors* • *Parasitology* • *Photochemical and Photobiological Sciences* • *Photochemistry and Photobiology* • *Physiology and Behavior* • *PLoS Biology* • *PLoS ONE* • *Polar Research* • *Preventive Veterinary Medicine* • *Proceedings of the National Academy of Science, USA* • *Proceedings of the Royal Society, B* • *Progress in Oceanography* • *Science of the Total Environment* • *Scientific Reports* • *Transactions of the American Fisheries Society* • *Trends in Ecology and Evolution* • *Vision Research*

Ad hoc peer review for funding agencies (22 agencies)

• Austrian Science Fund • United States National Science Foundation • United States National Institutes of Health • United States National Oceanic and Atmospheric Administration • United States Geological Survey • The New York State Academy of Sciences • Natural Sciences and Engineering Research Council of Canada • Genome Canada • Canada Excellence Research Chairs Program • The Israel Science Foundation • Natural Environment Research Council of the United Kingdom • The United Kingdom's Biotechnology and Biological Sciences Research Council • South African Foundation for Research and Development • The Portuguese Foundation for Science and Technology • Fonds Québécois de la Recherche sur la Nature et les Technologies • French National Research Agency • Council for the Earth and Life Sciences, Netherlands Organisation for Scientific Research • European Commission, HORIZON 2020 • Danish Council for Independent Research - Natural Sciences • Belgian Fund for Scientific Research • Chilean National Science and Technology Commission • Polish National Science Centre

PROFESSIONAL SERVICE AND ADVISING

- 2017- Member, Council (=Board of Directors), Committee on Publication Ethics
- 2014 - Member, Scientific Advisory Panel, Hellenic Centre for Marine Research, Division of Marine Biological Resources and Inland Waters
- 2013- Member, Selection Committee for the Elbert H. Ahlstrom Lifetime Achievement Award. Early Life History Section, American Fisheries Society
- 2013- Member, Panel of Eminent Experts to assess nominees for appointment as Fellows of the Earth and Planetary Sciences Section of the Indian Academy of Sciences
- 2012- Member, Panel of Reviewers for the Japan Prize, Selection Subcommittee for the Biological Production and Biological Environment nominees
- 2011- Member, College of Reviewers for the Canada Research Chairs Program
- 2011- Member, Scientific Steering Committee, Ocean Acidification Flagship Research Program, Fram High North Research Centre for Climate and the Environment, Tromsø, Norway
- 2010- Member, Editorial Policy Committee, Council of Science Editors
- 2010- Member, Arctic Ocean Acidification Assessment Group (a sub-group of the Arctic Monitoring and Assessment Programme)
- 2017 Program Moderator (animal consciousness sub-program) and Scientific Expert, Annual Meeting of the European Food Safety Authority's Annual Animal Health and Welfare Network Meeting, Parma, Italy
- 2017 Member, scientific steering committee, Symposium on "Science delivery for sustainable use of the Baltic Sea living resources", Tallinn, Estonia
- 2017 Examiner at the Ph.D. defense of Dr. Cyril Delfosse, Institut National Polytechnique de Toulouse, France
- 2016 Assessor of candidates for promotion, Tel Aviv University, Israel
- 2016 Panelist (by invitation), Ditchley Foundation conference - "Can the earth still sustain us? Biodiversity, resources and pollution. Ditchley Foundation, Oxfordshire, UK
- 2016 Second opponent at the Ph.D. defense of Dr. Ragnhild Valen, University of Bergen, Norway
- 2015 Examiner at the Ph.D. defense of Dr. Robin Failletaz, Université Pierre et Marie Curie, Laboratoire d'Océanographie de Villefranche, France
- 2015 Assessor of candidates for promotion to Full Professor with tenure, Oregon State University, College of Earth, Ocean and Atmospheric Science, Oregon, USA
- 2015 Assessor of candidates for promotion, Commonwealth Scientific and Industrial Research Organisation, Oceans and Atmosphere Flagship, CSIRO, Australia
- 2014 Member, Editor-in-Chief Search Committee for *Limnology and Oceanography*, Association for the Sciences of Limnology and Oceanography
- 2014 Member, Publishing Partner Assessment Committee, Association for the Sciences of Limnology and Oceanography
- 2013-2014 Member-at-Large, Board of Directors, Association for the Sciences of Limnology and Oceanography

- 11/2013 Panelist, "From Innovation to Market", a seminar organized by the Norwegian Design Council and the Research Council of Norway. Oslo, 7 November 2013.
- 2012-2015 Scientific Expert and Vice-Chair, Animal Health and Welfare Panel, European Food Safety Authority
- 2012-2013 Member, Comprehensive Evaluation/Future of Publications Committee, Association for the Sciences of Limnology and Oceanography, 2011-2013
- 2011 Member, Examination Board of Evandro Malanski's Master Dissertation, Federal University of Rio Grande, Institute of Oceanography, Brazil
- 2011 *Ad hoc* "Hearing Expert", Animal Health and Welfare Panel, European Food Safety Authority
- 2009-2010 Member, Scientific Steering Committee, "Ecosystems 2010: Global progress on ecosystem-based fisheries management", 26th Lowell Wakefield Fisheries Symposium, Anchorage, Alaska
- 2009 Member of the evaluation committee for the position "Professor in Environmental Plankton Ecology", Technical University of Denmark
- 2008-2009 Member, Research Council of Norway's working group on research on early life stages of fishes.
- 2007 Member, Committee to select the winner of the International Ecology Institute's Prize for Marine Ecology
- 2006 – 2008 Member, International Program Committee, World Fisheries Congress, Yokohama, Japan
- 09/2008 Co-Chair, Round-Table discussion on "Scientometrics, Bibliometrics & the Quantitative Evaluation of Research: Evaluating Articles, People & Institutes", 2nd European Conference on Scientific Publishing in Biomedicine and Medicine, Oslo, Norway
- 04/2008 Panelist, Working Group on Fisheries and Aquaculture – Sustainability and Governance, Global Forum on Oceans, Coasts, and Islands, Hanoi, Vietnam.
- 05/2007 Expert Panelist, European Commission Workshop on the Future of Fisheries and Aquaculture Research. Brussels.
- 06/05 – 12/2007 Member, Board of Directors, Eco-Ethics International Union-USA
- 02/05 – 11/2007 Director, Eco-Ethics International Union, Germany
- 01/05 – 11/2007 Staff Member, International Ecology Institute
- 05/04–09/2006 President (elected), Early Life History Section of the American Fisheries Society
- 03/2003 Primary Opponent (i.e. External Examiner) for the Ph.D. defense of Dr. Jan Borgeraas. University of Oslo, Norway
- 09/1999 Member, Promotion Committee, Institute of Marine Research, Bergen, Norway
- 09/95-12/1997 Member, Government of Canada Multi-Agency Task Force on the Biological and Ecological Impacts of Ultraviolet B Radiation
- 01/1994 Primary Opponent (i.e. External Examiner) for the Ph.D. defense of Dr. Terje van der Meeren. University of Bergen, Norway

ADMINISTRATIVE, ORGANIZING AND OTHER PROFESSIONAL EXPERIENCE

- 2016-2017 Member, Scientific Committee, BONUS Symposium on science delivery for sustainable use of the Baltic Sea living resources, Tallinn, Estonia
- 2014-2015 Member, Organizing Committee and Scientific Committee, 2015 annual Larval Fish Conference, Vienna, Austria
- 2014-2015 Member, Program Committee, 2015 annual meeting of the Council of Science Editors
- 05/2013 Member, Scientific Committee for the Arctic Ocean Acidification Conference, Bergen, Norway
- 07/2012 Lead organizer, 36th Annual Larval Fish Conference. Bergen, Norway
- 09/2011 Lead organizer, "Workshop on acidification in aquatic environments: What can marine science learn from limnological studies of acid rain". Fram Centre, Tromsø, Norway
- 08/2007 Lead organizer, "Effects of climate change on marine ecosystems". Theme session at the 42nd European Marine Biology Symposium, Kiel, Germany
- 07/2002 Lead organizer, 26th Annual Larval Fish Conference. Bergen, Norway
- 06/2001 Co-organizer (with M.J. Arts and R. Sommaruga) of "Ultraviolet radiation in aquatic systems: abiotic and biotic effects." A theme symposium to be held at the SIL 2001 meeting, Melbourne, Australia
- 06/2000 Co-organizer (with C.W. Hawryshyn) of "The Second Workshop on the Biology of Ultraviolet and Polarization Vision", Victoria, British Columbia. Proceedings published in the *Journal of Experimental Biology*
- 06/1996-03/1998 Member, Seminar Speaker and Library Committees. Maurice-Lamontagne Institute
- 09/1997 Scientist aboard the CSS Martha Black on a bio-optics research cruise in the Estuary and Gulf of St. Lawrence. Equipment deployed: rosette water sampler, CTD, Satlantic profiling radiometers, Optronic Laboratories scanning spectroradiometer. Maurice-Lamontagne Institute, Mont-Joli, Québec
- 09/1994, 95 & 96 Scientist aboard the CSS Parizeau on a research cruise in the St. Lawrence river estuary. Mission objective: zooplankton distribution and biomass survey. Equipment deployed: multi-channel echo sounder; bioness multi-net sampler; CTD; LI-COR LI-1800 underwater scanning spectroradiometer. Maurice-Lamontagne Institute, Mont-Joli, Québec
- 12/1992 Co-organizer (with C.W. Hawryshyn) of "The Biology of Ultraviolet Light Reception", a symposium held in conjunction with the American Society of Zoologists' annual meeting in Vancouver, British Columbia. Proceedings published in *Vision Research* v. 34(4), April 1994
- 01/1991-12/1992 Western Regional Representative, Early Life History Section of the American Fisheries Society
- 01 - 12/1990 Northeast Regional Representative, Early Life History Section of the American Fisheries Society
- 06/1988 Organizer of "Functional Development of Sensory Systems and Acquisition of Behaviour in Larval Fish", a special session of the 12th Annual Larval Fish Conference. University of Michigan, Ann Arbor. Proceedings published in *Brain, Behavior and Evolution*, 34(1), January 1989

- 08/87 - 05/1989 Vice President, Departmental Graduate Student Organization (GSO); Chair and Coordinator of GSO Speaker Committee. University of Kansas
- 04 - 05/1984 Assistant Scientist on a "Sea Semester" oceanographic teaching and research cruise in the Bahamas and north Atlantic, Sea Education Association, Woods Hole, U.S.A.
- 10/1983 Assistant Scientist, oceanographic cruise, St. Lawrence River Estuary, Institute of Oceanography, McGill University
- 09/83 - 05/84 Departmental Seminar Series Coordinator. Institute of Oceanography, McGill University

Membership in professional societies

- American Fisheries Society, 2001-
- Council of Science Editors, 2005-
- Committee on Publication Ethics, 2008-

COLLABORATORS

Current

Vera Chan, Clemson University, USA
 Caroline Durif, Institute of Marine Research, Norway
 David Fields, Bigelow Laboratory for Ocean Sciences, Boothbay Harbor, Maine, USA
 Haakon Hop, Norwegian Polar Institute
 Ellis Loew, Cornell University, USA
 Andrew Mount, Clemson University, USA
 Claire Paris, University of Miami, USA
 Jeffrey Runge, University of Maine, USA
 Anne Berit Skiftesvik, Institute of Marine Research, Norway
 Vengatesen Thiyagarajan, University of Hong Kong
 Frode Vikebø, Institute of Marine Research, Norway
 Gustavo Núñez-Acuña and Cristian Gallardo, University of Concepción, Chile

Past

Michael Arts, Environment Canada, Burlington, Ontario, Canada
 Luc Beaudet, University of Victoria, Canada
 Chris Chambers, NOAA-NMFS, New Jersey, USA
 Richard Cloutier, University of Quebec at Rimouski, Canada
 John Cullen, Dalhousie University, Canada
 Barbara Evans, Lake Superior State University, USA
 Inigo Novales Flamarique, Simon Fraser University, Canada
 Arild Folkvord, University of Bergen, Norway
 Peter Galbraith, Fisheries and Oceans Canada
 Amatzia Genin, Hebrew University of Jerusalem
 William C. Gordon, Louisiana State University School of Medicine, USA
 Craig Hawryshyn, Queen's University, Canada
 Bo Holmqvist, University of Lund, Sweden
 Ilmari Jokinen, University of Jyväskylä, Finland
 David Kirby, Oceanic Fisheries Programme, New Caledonia (South Pacific)
 Berit Kjeldstad, University of Trondheim., Norway
 Amit Lerner, National Institute of Oceanography, Haifa, Israel
 Brian M. Marcotte, Strategic Analysis, USA
 Bruce McArthur, Environment Canada
 W. John O'Brien (deceased), University of Kansas
 Ingegjerd Opstad, Institute of Marine Research, Norway
 Jan Pechenik, Tufts University
 John Phillips, Virginia Tech. University, USA

Henry Reiswig, McGill University, Canada
 Harri Salo, Jyvaskyla University, Finland
 Jean-Francois St-Pierre, Fisheries and Oceans Canada
 Ruben Sommaruga, University of Innsbruck, Austria
 Konstantinos Stergiou, Aristotle University of Thessaloniki, Greece
 Peter Thor, Norwegian Polar Institute
 Russel Vetter, NOAA-NMFS, California, USA
 Asbjørn Vøllestad, University of Oslo, Norway
 Marc Weissburg, Georgia Tech. University, USA
 Jeannette Yen, Georgia Tech. University, USA

TECHNIQUE, INSTRUMENTATION AND INFRASTRUCTURE DEVELOPMENT

- Aquatic/fish holding/larval fish rearing facility, University of Kansas
- Silhouette video imaging system for behavioural observations of small aquatic organisms, University of Kansas
- Aquatic/fish holding facility, University of Victoria
- Electrophysiological recording system for obtaining compound action potentials from the optic nerve of fishes, University of Victoria
- Aquatic/fish holding/larval fish rearing facility, Maurice-Lamontagne Institute
- Silhouette video imaging system for behavioural observations of small aquatic organisms, Maurice-Lamontagne Institute
- Computer-automated three-dimensional swimming movement (tracking and path analysis) system, Maurice-Lamontagne Institute
- Underwater scanning spectroradiometer, Maurice-Lamontagne Institute
- Solar simulator and incubation system for ultraviolet-B irradiation experiments, Maurice-Lamontagne Institute
- Silhouette video imaging system for behavioural observations of small aquatic organisms, Institute of Marine Research-Austevoll
- Computer-automated three-dimensional swimming movement (tracking and path analysis) system, Institute of Marine Research-Austevoll
- Underwater scanning spectroradiometer, Institute of Marine Research-Austevoll
- Microspectrophotometer, Institute of Marine Research-Austevoll
- Electrophysiology system, Institute of Marine Research-Austevoll
- Schlieren optical imaging system, Institute of Marine Research-Austevoll

PROFESSIONAL RECOGNITION, SCHOLARSHIPS AND AWARDS

- Best departmental seminar of the year, Institute of Marine Research, Bergen. For the lecture "Where has all of the recruitment research gone?" (2016)
- Invited keynote speaker, Second interdisciplinary symposium on ocean acidification and climate change. The Swire Institute of Marine Science, Hong Kong (2016)
- Invited keynote speaker, Second interdisciplinary symposium on ocean acidification and climate change. The Swire Institute of Marine Science, Hong Kong (2016)
- Invited keynote speaker, European College of Laboratory Animal Medicine and European Society of Laboratory Animal Veterinarians annual conference, Lyon, France (2016)
- Best departmental seminar of the year, Institute of Marine Research, Bergen. For the lecture "Applying organized skepticism to ocean acidification research, or some marine organisms will do just fine in a high CO₂ world" (2015)
- Distinguished Visiting Scholar, University of Hong Kong (November-December 2012)
- Sir Kirby Laing Eminent Visiting Professor, University of Wales, Bangor (April-May 2012)
- Distinguished Scientist Visitors Program, Ben-Gurion University, Eilat, Israel (March-April 2012)
- Invited keynote speaker, "Ecosystems 2010: Global progress on ecosystem-based fisheries management", 26th Lowell Wakefield Fisheries Symposium, Anchorage, Alaska (November 2010)
- Distinguished Visiting Scholar, University of Hong Kong (November - December 2009)

- Distinguished Visiting Scholar, Hong Kong University of Science and Technology and Chinese Academy of Science Oceanographic Institute (April 2007)
- Invited keynote speaker, 29th Annual Larval Fish Conference, Barcelona, Spain (2005)
- Invited keynote speaker, Societas Internationalis Limnologiae, Dublin, Ireland (1998)
- Invited keynote speaker, Workshop on Environment, Growth, Sexual Maturation and Recruitment in Fish, Bergen, Norway (1997)
- Invited keynote speaker, Inter-American Institute for Global Climate Change workshop on the Effects of Ultraviolet Radiation on Marine Ecosystems, Ensanada, Mexico (1996)
- Invited keynote speaker (ichthyoplankton session), Symposium on the Sensory Ecology and Physiology of Zooplankton, Honolulu, Hawaii (1995)
- La Fondation de l'Université du Québec à Montréal, Postdoctoral Research Fellowship (1993)
- Department of Fisheries and Oceans Canada, Postdoctoral Research Fellowship (1993)
- Medical Research Council of Canada, Postdoctoral Research Fellowship (1990-1993)
- Hamilton Foundation of Canada's E.B. Eastburn Postdoctoral Research Fellowship (1990)
- Québec Fonds pour la Formation de Chercheurs et l'Aide à la Recherche, Postdoctoral Research Fellowship (1990)
- Department of Fisheries and Oceans Canada, Postdoctoral Research Fellowship (1990)
- Graduated with honours from the doctoral program in Systematics and Ecology, University of Kansas (1989)
- Invited plenary session speaker, Symposium on the Early Life History of Fishes, International Council for the Exploration of the Seas (1988)
- Québec Ministry of Higher Education and Science, Postgraduate Scholarship (1988)
- Natural Sciences and Engineering Research Council of Canada, Postgraduate Scholarship (1985-1988)
- United Kingdom and Commonwealth Overseas Postgraduate Research Student Award (1985)
- McGill University, Faculty of Graduate Studies and Research, Postgraduate Scholarship (1983 & 1984)

ORAL AND POSTER PRESENTATIONS DELIVERED AT CONFERENCES

A selection of our lectures can be viewed [HERE](#)

12/2017- Núñez-Acuña, G., H.I. Browman, A.B. Skiftesvik & C. Gallardo-Escárate. Key receptors and kairomones involved in host-recognition mechanisms in sea lice *Lepeophtheirus salmonis* inferred from RNAi experiments.

International Conference on Biotechnology, Habana, Cuba

10/2017- Núñez-Acuña, G., D.M. Fields, S. Shema, H.I. Browman, A.B. Skiftesvik & C. Gallardo-Escárate. Host recognition mechanisms in the sea lice: genomic and functional approaches to identify novel chemoattractants derived from salmon skin.

Aquaculture Europe, Dubrovnik

09/2017- Cresci, A., C.B. Paris, C.M.F. Durif, S. Shema, R.M. Bjelland, A.B. Skiftesvik & H.I. BROWMAN. Glass eels (*Anguilla anguilla*) have a magnetic compass linked to the tidal cycle.

ICES Annual Science Conference, Fort Lauderdale, USA

08/2017- Cresci, A., C.B. Paris, C.M.F. Durif, S. Shema, R.M. Bjelland, A.B. Skiftesvik & H.I. BROWMAN. Glass eels (*Anguilla anguilla*) have a magnetic compass linked to the tidal cycle.

XIth International Larval Biology Symposium, Honolulu, Hawaii, USA

06/2017- Runge, J.A., David Fields, Cameron Thompson, Caroline Durif, Steven Shema, Reidun Bjelland, Anne-Berit Skiftesvik and Howard I. BROWMAN. Interaction between temperature and pH on growth and respiration of the planktonic copepod, *Calanus finmarchicus*.

Ecosystem Studies of Subarctic and Arctic Seas, 3rd Open Science Meeting on Subarctic and Arctic Science, Tromsø, Norway

- 01/2017- Bailey, Allison, De Wit, Pierre, Thor, Peter, Browman, Howard, Bjelland, Reidun, Shema, Steven, Fields, David M., Runge, Jeffrey, Thompson, Cameron, Hop, Haakon. Regulation of gene expression underpins tolerance of the Arctic copepod *Calanus glacialis* to increased pCO₂. Arctic Frontiers, Tromsø
- 12/2016- BROWMAN, H.I. Applying organized scepticism in ocean acidification research.
- BROWMAN, H.I. Fake news: the real life dangers of over-interpreting your results in a post-fact world.
- BROWMAN, H.I., J.A. Runge, D.M. Fields, C.R.S. Thompson, S.D. Shema, R.M. Bjelland, C.M.F. Durif & A.B. Skiftesvik. End of the century CO₂ concentrations do not have a negative effect on vital rates of *Calanus finmarchicus*, an ecologically critical planktonic species in North Atlantic ecosystems.
- Second interdisciplinary symposium on ocean acidification and climate change (ISOACC-2). University of Hong Kong, Hong Kong.
- 11/2016- BROWMAN, H.I. The challenges of aquatic animal welfare. Invited keynote lecture, European College of Laboratory Animal Medicine and European Society of Laboratory Animal Veterinarians annual conference, Lyon, France.
- 09/2016- BROWMAN, H.I., D.M. Fields & A.B. Skiftesvik. The sensory ecology of host finding in the free-living life history stages of the salmon louse, *Lepeophtheirus salmonis*.
- Bjelland, R.M., A.B. Skiftesvik, H.I. BROWMAN & C.M.F. Durif. The delousing efficiency of different species of cleanerfish, used alone and in various combinations.
- Skiftesvik, A.B., E.R. Loew, R.M. Bjelland, C.M.F. Durif, S. Shema, D.M. Fields & H.I. BROWMAN. Spectral sensitivity of cleanerfish.
- Sea Lice 2016, Westport, Ireland
- 05/2016- BROWMAN, H.I., J.A. Runge, D.M. Fields, C.R.S. Thompson, S.D. Shema, R.M. Bjelland, C.M.F. Durif & A.B. Skiftesvik. End of the century CO₂ concentrations do not have a negative effect on vital rates of *Calanus finmarchicus*, an ecologically critical planktonic species in North Atlantic ecosystems.
- Durif, C.M.F., D.M. Fields, H.I. BROWMAN, S.D. Shema, J. Enoae, A.B. Skiftsevik, R.M. Bjelland, R. Sommaruga & M. Arts. Cascading effects of UV radiation on a simple marine food chain.
- Fields, D.M., J.A. Runge, C. Thompson, S.D. Shema, R.M. Bjelland, C.M.F. Durif, A.B. Skiftesvik & H.I. BROWMAN. Infection of the planktonic copepod *Calanus finmarchicus* by the parasitic dinoflagellate, *Blastodinium* spp: effects on grazing, respiration, fecundity and fecal pellet production.
- Zarubin, M., Y. Lindemann, O. Brunner, D.M. Fields, H.I. BROWMAN & A. Genin. The effect of hydrostatic pressure on grazing in three calanoid copepods.
- 6th International Zooplankton Symposium, Bergen, Norway
- 05/2016- Bellerby, Richard, Howard I. BROWMAN, Wenting Chen, Andrew Constable, Sam Dupont, Haruko Kurihari, Mario Hoppema, Andrew Lenton, Nikki Lovenduski, Claire Lo Monaco, Jeremy Mathis, Eugene Murphy, Elizabeth Shadwick, Coleen Suckling & Scarlett Trimbom. Development and delivery of scientific knowledge and policy guidance on high latitude ocean acidification through different international organizational platforms.

Bailey, A. Pierre de Wit, Peter Thor, Howard I. BROWMAN, David Fields, Jeffrey Runge, Alex Vermont, Reidun Bjelland, Cameron Thompson, Steven Shema, Caroline Durif, Haakon Hop. Gene expression responses to increased pCO₂ during the larval development of the Arctic copepod *Calanus glacialis*.

4th International Symposium on the Oceans in a High CO₂ World, Hobart, Tasmania

02/2016 Skiftesvik, A.B., R. Bjelland, C.M.F. Durif, H.I. BROWMAN, D.I. Fields & E.R. Loew. Artificial light and cleanerfish.

Bjelland, R.M., A.B. Skiftesvik, C.M.F. Durif, H.I. BROWMAN, et al. Cleanerfish and predation.

Cleanerfish 2016 Conference, Oslo, Norway

12/2015- BROWMAN, H.I. The use and misuse of bibliometric indices in evaluating scholarly performance. The talk can be viewed [HERE](#).

10th Annual MUNIN Conference on Scholarly Publishing. Tromsø, Norway - the whole conference can be viewed [HERE](#)

11/2015- BROWMAN, H.I. Applying organized skepticism to ocean acidification research, or some marine organisms will do just fine in a high CO₂ world.

Bailey, A., P. Thor, H.I. BROWMAN, D. Fields, J. Runge, A. Vermont, R.M. Bjelland, C. Thompson, S. Shema, C. Durif & H. Hop. Arctic copepod *Calanus glacialis* larvae are tolerant to lowered pH. ***Received best poster award***

Fram Science Days, Tromsø, Norway

10/2015- Bellerby, R., J. Mathis, W. Chen, K. Azetsu-Scott, L. Miller, S. Dupont, H. BROWMAN. Arctic Ocean acidification: present understanding, management requirements and future research strategies

PICES Annual Meeting, Qindao, China

09/2015- BROWMAN, H.I. Applying organized skepticism to ocean acidification research, or some marine organisms will do just fine in a high CO₂ world.

ICES Annual Science Conference, Copenhagen

07/2015- Leuschner, R., H.I. BROWMAN, M. Raj and Antonio Velarde. The EFSA approach to assessing proposals for new stunning methods.

Humane Slaughter Association International Symposium, Zagreb, Croatia

07/2015- Cresci, A., C.B. Paris, C.M.F. Durif, S. Shema, R. Bjelland, A.B. Skiftesvik and H.I. BROWMAN. Orientation of European glass eel (*Anguilla anguilla*) arriving at the Norwegian coast.

Paris, C.B., H.I. BROWMAN, A.B. Skiftesvik, S. Shema, M. Foretich, C.J. O'Brien, A. Cresci, R.M. Bjelland and C.M.F. Durif. Ontogeny of orientation in Atlantic haddock larvae measured *in situ*.

Annual Larval Fish Conference, Vienna, Austria

02/2015- Bailey, Allison, P. Thor, H.I. BROWMAN, D. Fields, J. Runge, A. Vermont, R. Bjelland, C. Thompson, S. Shema, C. Durif. The effects of projected ocean acidification on the early development of the key Arctic copepod, *Calanus glacialis*.

ASLO Aquatic Sciences Conference, Granada, Spain

- 12/2014- Bailey, Allison, P. Thor, H. I. BROWMAN, D. Fields, J. Runge, A. Vermont, R. Bjelland, C. Thompson, S. Shema, C. Durif. The effects of projected ocean acidification on the early development of the key Arctic copepod, *Calanus glacialis*.
- Arctic Change 2014, Ottawa, Ontario, Canada
- 09/2014- Leuschner, R., H.I. BROWMAN, M. Raj and Antonio Velarde. Applying the 3Rs principle in research studies relevant to the European Welfare Regulation on the protection of animals at the time of killing.
- 50th Congress of the European Societies of Toxicology, Edinburgh, UK
- 08/2014- Durif, C.M.F., H.I. BROWMAN, J. Phillips, A.B. Skiftesvik, L.A. Vøllestad & H.H. Stockhausen. Orientation and navigation of the European eel using the Earth's magnetic field and its possible implications for management.
- 144th Annual Meeting of the American Fisheries Society, Quebec City, Quebec, Canada
- 02/2014- Fields, D. M.; BROWMAN, H. I.; Twining, B. S. Copepod intestines: 10²¹ microbioreactors of global ocean processes. ASLO conference, Honolulu, Hawaii
- 12/2013- Lerner A. & H. I. BROWMAN. Negative polarotaxis in the copepod *Calanus finmarchicus* (Calanidae) – Is it a strategy against polarization-sensitive predators? 50th annual meeting of the Israel Zoological Society, Tel-Aviv University, Israel (in Hebrew).
- 10/2013- Skiftesvik, A.B., R.M. Bjelland, H.I. BROWMAN & C.M.F. Durif. Wrasse biology and ecology. Stirling University wrasse workshop.
- 09/2013- Runge, J.A., C. Thompson, R.M. Bjelland, H.I. BROWMAN, C.M.F. Durif, D.M. Fields, S. Shema & A.B. Skiftesvik. Effects of ocean acidification on growth and development of the planktonic copepod, *Calanus finmarchicus*. U.S. National Science Foundation, 2nd U.S. Ocean Acidification Principal Investigator's Meeting. Washington, D.C., USA
- 05/2013- BROWMAN, H.I., J. Havenhand, S. Dupont & L. Robbins. AMAP Arctic Ocean Acidification White Paper, Chapter 3, Biological responses to ocean acidification. AMAP International Conference on Arctic Ocean Acidification, Bergen, Norway - the talk can be viewed [HERE](#), at the 16.00 minute time point
- 02/2013- Fields, D.M., B.S. Twining & H.I. Browman. Copepod intestines: 10²¹ microbioreactors of global ocean processes. ASLO conference, New Orleans, LA, USA
- 12/2012- BROWMAN, H.I., R.H. Maneja, C.M.F. Durif, R.M. Bjelland, A.B. Skiftesvik, D.M. Fields, S. Shema & J.A. Runge. Effects of ocean acidification on boreal and sub-Arctic fish larvae and zooplankton. Interdisciplinary symposium on ocean acidification and climate change. The Swire Institute of Marine Science, Hong Kong.
- 07/2012- Maneja, R.H., Frommel, A.Y., Clemmesen, C., Piatkowski, U., Geffen, A.J., Folkvord, A., BROWMAN, H.I., Durif, C.M.F., Bjelland, R., Skiftesvik, A.B. Effects of ocean acidification on the swimming kinematics of larval Atlantic cod (*Gadus morhua*) and Atlantic herring (*Clupea harengus*).
- Fukunishi, Y., BROWMAN, H. I., Durif, C. M. F., Bjelland, R. M., Shema, S., Skiftesvik, A. B., Sub-lethal exposure to ultraviolet radiation reduces prey consumption by Atlantic cod larvae (*Gadus morhua*).
- Durif, C.M.F., BROWMAN, H.I., Fields, D., Shema, S., Fuschino, J., Bjelland, R.M., Skiftesvik A.B., Arts, M. and Sommaruga, R. Cascading effects of UV radiation on the nutritional quality of the food base in marine ecosystems.
- Loew, E.R., H.I. BROWMAN & A.B. Skiftesvik. Ontogenetic shift and variability in the visual pigments of the Ballan wrasse, *Labrus bergylta*.

36th Annual Larval Fish Conference, Bergen, Norway.

06/2011- BROWMAN, H.I. Assessing the effect of ocean acidification on marine organisms. Research Seminar on Ocean Acidification, High North Research Centre on Climate and the Environment. Tromsø, Norway

05/2011- Vollset, K.W., A. Folkvord & H.I. BROWMAN. Feeding behaviour of larval cod (*Gadus morhua*) at low light intensities.

Fukunishi, Y. & H.I. BROWMAN. Sub-lethal effects of ultraviolet radiation on anti-predator performance of cod larvae.

35th Annual Larval Fish Conference, Wilmington, North Carolina, USA

11/2010 – BROWMAN, H.I. The ecosystem approach to managing marine resources has a lot to do with management but little to do with ecology or ecosystems. Keynote address, Ecosystems 2010, Fairbanks, Alaska, USA

09/2010- BROWMAN, H.I. Assessing the effect of ocean acidification on marine organisms. Research Seminar on Ocean Acidification, Opening Conference of the High North Research Centre on Climate and the Environment, Tromsø, Norway

09/2010- BROWMAN, H.I. Assessing the effect of ocean acidification on marine organisms. Workshop on Polar, Environmental and Climate Change Research, Sino-Norwegian Cooperation to meet global challenges, Shanghai

06/2010 – BROWMAN, H.I. & A.B. Skiftesvik. A mechanistic perspective on the fine-scale interactions between ichthyoplankton and zooplankton. ASLO 2010 Summer Conference, Santa Fe, New Mexico, USA

06/2010 – BROWMAN, H.I. & A.B. Skiftesvik. Direct and indirect effects of UV radiation on the early life stages of fish and their prey in warming temperate and sub-arctic oceans. Invited talk, 34th Annual Larval Fish Conference, Santa Fe, New Mexico, USA

03/2010 – BROWMAN, H.I., J. Yen, D.M. Fields, J-f St-Pierre & A.B. Skiftesvik. Predatory behaviour of the carnivorous copepod *Euchaeta norvegica* and escape responses of their ichthyoplankton prey (Atlantic cod, *Gadus morhua*). Understanding and quantifying mortality in pelagic, early-life stages of marine organisms: experiments, observations and models. Aberdeen, Scotland

06/2009 – BROWMAN, H.I. The ecosystem approach to managing marine resources is missing the ecology. Third GLOBEC Open Science Conference. Victoria, British Columbia, Canada.

09/2008 – BROWMAN, H.I. The use and misuse of bibliometric indices in evaluating scholarly performance. 2nd European Conference on Scientific Publishing in Biomedicine and Medicine, Oslo, Norway.

08/2008 - Bjelland, R.M., A.B. Skiftesvik & H.I. BROWMAN. Behavioural responses of larval cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) to odours. 32nd Annual Larval Fish Conference, Kiel, Germany.

09/2007 – BROWMAN, H.I. Challenges facing the peer-review process in scholarly publishing. ICES Annual Science Conference, Helsinki, Finland.

08/2007 – BROWMAN, H.I. Ultraviolet radiation impacts on the early life stages of zooplankton and fishes. 42nd European Marine Biology Symposium, Kiel, Germany.

07/2007 – Skajaa, K. & H.I. BROWMAN. The escape response of food-deprived cod larvae. 31st Annual Larval Fish Conference, St. John's, Newfoundland, Canada.

- 06/2007 – BROWMAN, H.I. & A.B. Skiftesvik. Unresolved issues surrounding the effect of micro-scale turbulence on the behaviour of ichthyoplankton. Euromech Colloquium. The Influence of Fluid Dynamics on the Behaviour and Distribution of Plankton, Liverpool, UK.
- 01/2007 - Arts, M.T., I. D. Zellmer, H.I. BROWMAN & I. Jokinen. "The effects of UV radiation on primary producers and their consumers; a comparison between lab and field studies." Arctic Frontiers 2007, Tromsø, Norway
- 09/2006 Yacoob, S.Y. & H.I. BROWMAN. Physiological and behavioural responses to chemical stimulants in juvenile Atlantic halibut.
- Lambrey de Souza, J., R. Cloutier & H.I. BROWMAN. Description of chondrocranial development in the larvae of intensively cultured Atlantic halibut (*Hippoglossus hippoglossus*).
- 30th Annual Larval Fish Conference, Lake Placid, New York, USA
- 06/2006 Jokinen, E.I., H.M. Salo, H.I. BROWMAN, P. Kuhn & M.T. Arts. Exposure to ultraviolet-B radiation and increased ambient temperature alters growth, condition and immune function of juvenile Atlantic salmon, *Salmo salar*. ASLO Summer Meeting, Victoria, B.C., Canada
- 05/2006 BROWMAN, H.I. Where is the ecology in the ecosystem based approach to fisheries management?
- Ecofish Workshop, Bergen, Norway
- 04/2006 BROWMAN, H.I. & A.B. Skiftesvik. Half-truths and myths surrounding feeding and escape behaviour in marine fish larvae.
- Workshop on advancements in modelling physical-biological interactions in fish early-life history: recommended practices and future directions. Nantes, France
- 07/2005 Bjelland, R.M., A.B. Skiftesvik & H.I. BROWMAN. The effect of odours on the behaviour of cod larvae.
- BROWMAN, H.I. A 21st Century perspective on the embryology, ethology and ecology of ontogenetic sensitive periods in fishes.
- 29th Annual Larval Fish Conference, Barcelona, Spain
- 06/2005 Arts, M.T., BROWMAN, H.I. & I. Jokinen. Direct effects of long term exposure to solar UV radiation on fatty acids of Atlantic salmon (*Salmo salar*) held in outdoor tanks. ASLO Summer Meeting, Santiago de Compostella, Spain
- 06/2005 BROWMAN, H.I. Half-truths and myths surrounding feeding and escape behaviour in cod larvae.
- ICES/GLOBEC Workshop on the Impact of Zooplankton on Cod Abundance and Production, Copenhagen, Denmark
- 04/2005 Andersen, S., A.B. Skiftesvik & H.I. Browman. Swimming behaviour of *Pecten maximus* larvae. 15th International Pectinid Workshop. Queensland, Australia
- 09/2004 Galbraith, P.S., H.I. BROWMAN, P.S. Galbraith, R. Racca, A.B. Skiftesvik and J.-F. St-Pierre. Energetics of foraging in Atlantic cod (*Gadus morhua*) larvae: effects of micro-scale turbulence.
- Breien, MT & H.I. BROWMAN. The three-dimensional prey field of *Meganyctiphanes norvegica* and the escape responses of their copepod prey.
- ICES Annual Science Conference, Vigo, Spain

- 05/2004 Jokinen, E.I., H.I. BROWMAN, S.E. Markkula, H.M. Salo and M.T. Arts. Immunomodulatory effects of exposure to ultraviolet-B radiation in juvenile Atlantic salmon. Sixth International Symposium on Fish Immunology, Turku, Finland
- 06/2004 BROWMAN, H.I., J.-F. St-Pierre, A.B. Skiftesvik and R.G. Racca. Behaviour of Atlantic cod (*Gadus morhua*) larvae: an attempt to link maternal condition with larval quality.
- Yahiya Yacoob, S. and H.I. BROWMAN. Olfactory sensitivity of juvenile cod to amino acids.
- ICES Gadoid Mariculture: Development and Future Challenges. Bergen, Norway
- 05/2004 BROWMAN, H.I. Foraging behaviour in Atlantic lumpfish larvae. 28th Annual Larval Fish Conference. Clemson, USA
- 05/2004 BROWMAN, H.I., Alonso Rodriguez, C., Béland, F., Cullen, J.J., Davis, R.F., Kouwenberg, J.H.M., Kuhn, P., McArthur, B., Runge, J.A., St.-Pierre J.-F. & R.D. Vetter. Ultraviolet radiation impacts on the early life stages of Atlantic cod (*Gadus morhua*) and their prey. ICES Symposium on The Influence of Climate Change on North Atlantic Fish Stocks. Bergen, Norway
- 03/2004 Skiftesvik, A.B., S. Anderson and H.I. BROWMAN. The effect of environmental factors on viability of great scallop larvae: assessment of feeding and behaviour.
- BROWMAN, H.I., D. Fields and M. Weissburg. Spike recordings from the antennular chemoreceptors of adult salmon louse (*Lepeophtheirus salmonis*) in response to host-related odours.
- Research Council of Norway, Aquaculture Program Conference, Oslo, Norway
- 09/2003 Boxaspen, K., H.I. BROWMAN and A.B. Skiftesvik. Behavioural changes in salmon lice (*Lepeophtheirus salmonis*) larvae in step salinity gradients and implications for infestation dynamics in fjord systems European Association of Fish Pathologists, 11th International Conference on "Diseases of Fish and Shellfish", St. Julians, Malta
- 08/2003 Galbraith, P.S., H.I. BROWMAN, R. Racca; A.B. Skiftesvik and J.-F. St-Pierre. The effect of turbulence on the energetics of foraging in fish larvae. 27th Annual Larval Fish Conference, Santa Cruz, California, USA
- 08/2003 BROWMAN, H.I., R.D. Vetter, C. Alonso Rodriguez, J.J. Cullen, R.F. Davis, E. Lynn, J.-F. St-Pierre. Ultraviolet (280 - 400 nm) induced DNA damage in Atlantic cod (*Gadus morhua*) eggs and larvae. Annual Meeting of the American Fisheries Society, Quebec City, Canada
- 04/2003 Andersen, S., BROWMAN, H., & Skiftesvik, A.B. Comparative studies of feeding and behaviour of great scallop (*Pecten maximus* L.) larvae. 14th International Pectinid Workshop, Florida, USA.
- 10/2002 Andersen, S., BROWMAN, H., & Skiftesvik, A.B. Recent developments in aquaculture production of great scallop spat (*Pecten maximus*) in Norway. Aquaculture Europe, Trieste, Italy.
- 10/2002 Browman, Howard, Anne Berit Skiftesvik, Marise Bélanger & Reidun Bjelland. Does ultraviolet-A and polarized light in the rearing environment affect the growth rate of marine fish larvae? Research Council of Norway Program Meeting on Marine Ecosystems, Bergen, Norway
- 09/2002 Browman, Howard, Anne Berit Skiftesvik, Bo Holmqvist, Syed Yahiya Yacoob & Reidun Bjelland. Sensory biology and behaviour in the service of aquaculture.
- Browman, Howard, Karin Boxaspen, Anne Berit Skiftesvik & Penny Kuhn. Sensory biology and behaviour studies of salmon lice nauplii and copepodids .
- Research Council of Norway Program Meeting on Aquaculture and Wild Salmon, Tromsø, Norway

- 07/2002 BROWMAN, H.I., B. Holmqvist, J. Forsell, L. Ebbesson and P. Alm. Life-stage dependent changes, and thyroid hormone-mediated plasticity, in the retinal ultraviolet photoreceptor cell complement of Atlantic salmon.
- BROWMAN, H.I., J.-F. St-Pierre and A.B. Skiftesvik. Activity and prey search behaviour in Atlantic cod (*Gadus morhua*) larvae: an attempt to link indices of larval "performance" with indices of maternal condition.
- Evans, B.I. & H.I. BROWMAN. Variation in the development of the fish retina. To what extent does good vision matter?
- Skiftesvik, A.B., H.I. BROWMAN & J.-F. St-Pierre. Life in green water: the effect of algae on the foraging and prey search behaviour of Atlantic cod larvae.
- Galbraith, P., H.I. BROWMAN, R. Racca & A.B. Skiftesvik. The effect of turbulence on the net energy gain of feeding fish larvae.
- Vetter, R.D. & H.I. BROWMAN. The effects of solar ultraviolet radiation on pelagic fish eggs and larvae: laboratory and field approaches.
- Yen, J., H.I. BROWMAN, M. Belanger and J.-F. St-Pierre. Role reversal: the gladiatorial match between the carnivorous copepod *Euchaeta norvegica* and Atlantic cod (*Gadus morhua*) larvae.
- 26th Annual Larval Fish Conference, Bergen, Norway
- 01/2002 Skiftesvik, A.B., I. Novales Flamarique, H.I. BROWMAN, M. Bélanger & K. Boxaspen. Ontogenetic changes in visual responses of the parasitic salmon Louse, *Lepeophtheirus salmonis*, to ultraviolet and polarized light.
- Browman, H.I., J. Forsell, B. Holmqvist, L. Ebbesson & P. Alm. Life-stage dependent changes and thyroid hormone-mediated plasticity in the retinal ultraviolet photoreceptor cell complement of Atlantic salmon (*Salmo salar*).
- Annual Meeting of the Society for Integrative and Comparative Biology, Anaheim, California
- 11/2001 BROWMAN, H.I. Impacts of solar ultraviolet radiation on the early life stages of crustaceans and fishes in marine coastal waters. Arctic Climate Impacts Assessment Group meeting, Tromsø, Norway
- 09/2001 BROWMAN, H.I., B. Holmqvist, J. Forsell, L. Ebbesson and P. Alm. Life-stage dependent changes, and thyroid hormone-mediated plasticity, in the retinal ultraviolet photoreceptor cell complement of Atlantic salmon. Swedish Medical Research Council, Annual Meeting on Vision Physiology. Sanderborg, Denmark
- 08/2001 BROWMAN, H.I., I. Novales Flamarique, M. Bélanger, and A.B. Skiftesvik. Does ultraviolet-A and polarized light in the rearing environment affect the growth rate of marine fish larvae? 25th Annual Larval Fish Conference, Sandy Hook, New Jersey, USA
- 05/2001 BROWMAN, H.I., I. Novales Flamarique, M. Bélanger, K. Boxaspen & A.B. Skiftesvik. Ontogenetic changes in visual responses of the parasitic salmon louse, *Lepeophtheirus salmonis*, The Cultivation of Salmon II, Bergen, Norway
- 03/2001 BROWMAN, H.I., I. Novales Flamarique, M. Bélanger, K. Boxaspen & A.B. Skiftesvik. Ontogenetic changes in visual responses of the parasitic salmon louse, *Lepeophtheirus salmonis*,
- Andersen, S., H.I. BROWMAN & A.B. Skiftesvik. Studies on the rearing environment for giant scallop (*Pecten maximus*).
- Annual Symposium of The Research Council of Norway, Trondheim, Norway

- 02/2001 BROWMAN, H.I., Alonso Rodriguez, C., Béland, F., Cullen, J.J., Davis, R.F., Kouwenberg, J.H.M., Kuhn, P., McArthur, B., Runge, J.A., St.-Pierre J.-F. & R.D. Vetter. Ultraviolet radiation and the early life stages of marine crustacean zooplankton and ichthyoplankton – a case study from the estuary and Gulf of St. Lawrence, Canada. SIL 2001 Meeting, Melbourne Australia
- 11/2000 BROWMAN, H.I. Assessing the impacts of solar ultraviolet radiation on the early life stages of crustacean zooplankton and ichthyoplankton in marine coastal systems.
- Skiftesvik, A.B., Bjelland, R.M. & H.I. BROWMAN. Larval development and start feeding of the ballan wrasse (*Labrus bergylta*).
- 24th Annual Larval Fish Conference, Gulf Shores, Alabama
- 09/2000 BROWMAN, H.I. & I. Novales Flamarique. Wavelength-dependent polarization orientation in *Daphnia*. Swedish Medical Research Council, Annual Meeting on Vision Physiology. Karlskrona, Sweden
- 08/2000 BROWMAN, H.I., C. Alonso Rodriguez, F. Béland, J.J. Cullen, R.F. Davis, J.H.M. Kouwenberg, P. Kuhn, B. McArthur, J.A. Runge, J.-F. St-Pierre, & R.D. Vetter. 2000. The impact of ultraviolet radiation on marine crustacean zooplankton and ichthyoplankton: A review and synthesis of results from the estuary and Gulf of St. Lawrence, Canada. The Sharpening of Occam's Razor or Oceanography for the New Millenium. Crete, Greece.
- 07/2000 Kjeldstad, B., O. Frette, S.R. Erga, H.I. BROWMAN, P. Kuhn, R. Davis, W. Miller & J. Stamnes. Penetration of solar ultraviolet radiation in a Norwegian fjord system. 13th International Congress on Photobiology, San Francisco.
- 06/2000 Skiftesvik, A.B., I. Novales Flamarique, H.I. BROWMAN, M. Bélanger & K. Boxaspen. Ontogenetic changes in visual responses of the parasitic salmon louse, *Lepeophtheirus salmonis*, to ultraviolet and polarized light.
- BROWMAN, H.I. & I. Novales Flamarique. Wavelength-dependent polarization orientation in *Daphnia*.
- Second Workshop on the Biology of Ultraviolet and Polarization Vision. Victoria, B.C., Canada
- 07/99 BROWMAN, H.I., F. Béland, J.J. Cullen, R.F. Davis, J.H.M. Kouwenberg, J.-F. St-Pierre & R.D. Vetter. The effect of solar ultraviolet radiation (280-400 nm) on the early life history stages of Atlantic cod (*Gadus morhua*).
- Skiftesvik, A.B. & H.I. BROWMAN. Prey search pattern and foraging behaviour of Atlantic herring (*Clupea harengus*) larvae: a reassessment of the cruise searcher characterization. Journal of Fish Biology 55(Supplement A): 249-250.
- Skiftesvik, A.B., R.M. Bjelland & H.I. BROWMAN. Larval development and start feeding of the Ballan wrasse (*Labrus bergylta*). Journal of Fish Biology 55(Supplement A): 249.
- Environment, Development and Growth of Fishes, Annual International Symposium of the Fisheries Society of the British Isles, St. Andrews, Scotland.
- 06/99 Boxaspen, K., A.B. Skiftesvik & H.I. BROWMAN. Behavioural studies of nauplii and copepodites of salmon lice (*Lepeophtheirus salmonis* Krøyer). Possible effects of physical parameters on position of larvae. Fourth International Conference on Sea Lice. Trinity College, Dublin, Ireland
- 04/99 BROWMAN, H.I., F. Béland, J.J. Cullen, R.F. Davis, J.H.M. Kouwenberg, J.-F. St-Pierre & R.D. Vetter. The effect of solar ultraviolet radiation (280-400 nm) on the early life history stages of Atlantic cod (*Gadus morhua*).
- Skiftesvik, A.B. & H.I. BROWMAN. Foraging behaviour and prey search pattern of Atlantic herring (*Clupea harengus*) larvae: a reassessment of the cruise searcher characterization.

23rd Annual Larval Fish Conference, Beaufort, North Carolina, USA.

- 11/98 Kuhn, P.S., H.I. BROWMAN, R.F. Davis & J.J. Cullen. Optical properties of the estuary and Gulf of St. Lawrence are used to determine the potential impacts of UV-B radiation on the early life stages of cod and *Calanus finmarchicus*.
- BROWMAN, H.I., P.S. Kuhn, B. McArthur, & J.-F. St-Pierre. Penetration of ultraviolet radiation in the waters of the estuary and Gulf of St. Lawrence.
- Ocean Optics XIV, Kailua-Kona, Hawaii.
- 10/98 Alonso Rodriguez, C., H.I. BROWMAN & J.A. Runge. Ultraviolet radiation (280-400 nm)-induced mortality on the eggs of a marine copepod, *Calanus finmarchicus*. Forum Québécois en Sciences de la Mer-Océans et Changements Climatiques Globaux, Laval, Québec.
- 09/98 Dutil, J.-D., D. Gascon, M. Castonguay, M.O. Hammill, P. Ouellet, Y. Lambert, D. Chabot, H. BROWMAN, D. Gilbert, A. Fréchet, J.-A. Gagné & L. Savard. Biological limits to tradeoffs between biological and social considerations in fish stock management: the need to factor in stock productivity. ICES Annual Science Conference, Cascais, Portugal.
- 06/98 McArthur, L.J.B., H.I. BROWMAN & P.S. Kuhn. Underwater measurements of spectral UV irradiance in the Gulf of St. Lawrence. European Conference on Atmospheric UV Radiation, Helsinki, Finland.
- 05/98 BROWMAN, H.I., J.H.M. Kouwenberg, J.A. Runge, J.-F. St-Pierre, P. Kuhn, F. Beland, C. Alonso Rodriguez, B. McArthur, J.J. Cullen, R.F. Davis, & R.D. Vetter. Radiations ultraviolettes dans l'estuaire et le golfe du Saint-Laurent: monitoring et effets sur les organismes du milieu marin. 66th Annual Meeting of l'Association canadienne-française pour l'avancement des sciences, Québec City.
- 02/98 Alonso, C., H.I. BROWMAN & J.A. Runge. Impact of solar ultraviolet radiation (280-400nm) on hatching success in the eggs of a marine copepod, *Calanus finmarchicus*.
- Kuhn, P., H.I. BROWMAN, B. McArthur & J.-F. St-Pierre. Penetration of ultraviolet radiation in the St. Lawrence Gulf and Estuary and its potential effects on *Gadus morhua* and *Calanus finmarchicus*.
- American Society of Limnology and Oceanography, Ocean Sciences Meeting, San Diego, California.
- 10/97 BROWMAN, H.I. Critical factors in the early life history of fishes. Environment, Growth, Sexual Maturation and Recruitment in Fish. Bergen, Norway.
- 09/97 BROWMAN, H.I. Changes in the atmosphere-ocean flux of solar ultraviolet radiation and its impacts on the early life stages of crustaceans and fish. Tenth Anniversary Meeting of the Montreal Protocol on Ozone Depleting Substances, Montreal, Quebec.
- 02/97 Kouwenberg, J.H.A., H.I. BROWMAN & J.A. Runge. Exposure response and polychromatic action spectra for UV-B induced egg mortality in Atlantic cod and *Calanus finmarchicus* (Copepoda Calanoida). American Society for Limnology and Oceanography, Sante Fe, New Mexico.
- 01/97 Kouwenberg, J.H.A., H.I. BROWMAN & F. Béland. Exposure response to UV-B radiation and a polychromatic action spectrum for mortality in Atlantic cod eggs (*Gadus morhua* Linnaeus).
- Béland, F. & H.I. BROWMAN. Effect of UV radiation on Atlantic cod eggs (*Gadus morhua*).
- Canadian Conference for Fisheries Research, Ottawa.

- 09/96 BROWMAN, H.I. & R.D. Vetter. Impacts of ultraviolet radiation on zooplankton and ichthyoplankton. Workshop on the Effects of Ultraviolet Radiation on Marine Ecosystems, Ensanada, Mexico.
- 06/96 BROWMAN, H.I., A.B. Skiftesvik & R. Racca. Turbulence and ichthyoplankton-zooplankton interactions: a sensitivity analysis and critique of the assumptions underlying the behavioural components of analytical models.
- Skiftesvik, A.B. & H.I. BROWMAN. Foraging behaviour and prey search pattern in American plaice larvae (*Hippoglossoides platessoides*): debunking the cruise search myth.
- Annual Larval Fish Conference, New Orleans.
- 01/96 BROWMAN, H.I., R.C. Chambers & W.C. Leggett. Foraging and prey search behaviour in Atlantic cod larvae. Canadian Conference for Fisheries Research, Montréal.
- 09/95 BROWMAN, H.I. The potential impact of ultraviolet-B radiation on marine invertebrate larvae. DFO/IFREMER Workshop, Arcachon, France.
- 01/95 BROWMAN, H.I. The neurobiology, ethology and ecology of ontogenetic sensitive periods in fishes revisited. Sensory Ecology and Physiology of Zooplankton Symposium. Honolulu, Hawaii.
- 06/94 BROWMAN, H.I. Are fish larvae really cruise predators and do they search for prey while swimming?
- BROWMAN, H.I., R.C. Chambers & W.C. Leggett. Prey search behaviour and encounter rate in Atlantic cod larvae.
- Larval Fish Conference, St. Andrews, New Brunswick.
- 08/93 BROWMAN, H.I. Prey search patterns in fish larvae: implications for evaluations of feeding ecology. Larval Ecology Meeting, Long Island, NY
- 12/92 BROWMAN, H.I. & C.W. Hawryshyn. Developmental landscapes for ultraviolet photosensitivity in fishes: Loss of the UV mechanism is reversible and can be manipulated by thyroid hormone and retinoic acid. *Amer. Zool.* 32: 130A.
- BROWMAN, H.I., I. Novales-Flamarique & C.W. Hawryshyn. Ultraviolet photoreception, prey search behaviour, and visual acuity in juvenile zooplanktivorous fishes. *Amer. Zoologist* 32: 2A.
- Symposium on The Biology of Ultraviolet Light Reception, American Society of Zoologists, Vancouver, British Columbia.
- 11/92 Ruhe, P., W.J. O'Brien & H.I. BROWMAN. Direct observation of a foraging Centrarchid: search volume and prey choice. Thirteenth Annual Midwest Population Biology Conference, Normal, Illinois.
- 08/92 Beaudet, L., H.I. BROWMAN & C.W. Hawryshyn. Spectral and temporal characteristics of the optic nerve fibers in juvenile and adult rainbow trout. Abstract No. 282, Proceedings of the Third International Congress of Neuroethology, Montréal.
- 11/91 BROWMAN, H.I. & C.W. Hawryshyn. Thyroxine-induced changes in the spectral sensitivity of rainbow trout, *Oncorhynchus mykiss*. *Society for Neuroscience Abstracts* 17:299.
- Beaudet, L., H.I. BROWMAN & C.W. Hawryshyn. Ontogenetic loss of UV photosensitivity in rainbow trout, determined using optic nerve compound action potential recording. *Society for Neuroscience Abstracts* 17:299.

Hawryshyn, C.W., L. Beaudet & H.I. BROWMAN. ON and OFF responses from optic nerve compound action potential recordings in two teleost fishes. Society for Neuroscience Abstracts 17:1376.

Annual Meeting of the Society for Neuroscience.

- 06/91 BROWMAN, H.I. & C.W. Hawryshyn. Thyroxine induces precocial loss of UV light sensitivity in rainbow trout. N.A.T.O.- Avanced Study Institute: The Changing Visual System, Viterbo, Italy.
- 01/90 BROWMAN, H.I., W.C. Gordon, B.I. Evans & W.J. O'Brien. Correlation between histological and behavioral estimates of visual acuity in a zooplanktivorous fish, the white crappie (*Pomoxis annularis*). Canadian Conference for Fisheries Research, Ottawa, Ontario.
- 09/89 BROWMAN, H.I., W.C. Gordon, B.I. Evans & W.J. O'Brien. Correlation between histological and behavioral estimates of visual acuity in a zooplanktivorous fish, the white crappie (*Pomoxis annularis*). Proceedings of the 2nd International Congress of Neuroethology, Berlin, Poster # 190.
- 08/89 BROWMAN, H.I., W.C. Gordon, B.I. Evans & W.J. O'Brien. Correlation between histological and behavioral estimates of visual acuity in a zooplanktivorous fish, the white crappie (*Pomoxis annularis*). International Symposium on Fish Vision, Oristano (Sardinia), Italy.
- 06/89 Kruse, S., H.I. BROWMAN & W.J. O'Brien. Foraging behavior of the predaceous Cladoceran, *Leptodora kindti*. American Society for Limnology and Oceanography, Fairbanks, Alaska.
- 10/88 BROWMAN, H.I. The biology and behavioural ecology of ontogenetic critical periods in fish. International Council for the Exploration of the Seas, Symposium on the Early Life History of Fish, Bergen, NORWAY.
- 08/88 O'Brien, W.J., H.I. BROWMAN & B.I. Evans. The generality and utility of saltatory search. Ecological Society of America, Davis, CA.
- 06/88 BROWMAN, H.I. The biology and behavioural ecology of ontogenetic critical periods.
- BROWMAN, H.I. & W.J. O'Brien. The acquisition of visually-guided foraging skills and search tactics in the golden shiner, *Notimegonus crysoleucas*.
- Larval Fish Conference, Ann Arbor, MI.
- 08/87 O'Brien, W.J., B.I. Evans & H.I. BROWMAN. Saltatory search by a planktivorous fish: a newly discovered search strategy and its implications. Ecological Society of America, Providence, RI.
- 06/87 Reiswig, H.M. & H.I. BROWMAN. Use of membrane filters for microscopic preparations of sponge spicules. Society for the Preservation of Natural History Collections, Montréal.
- 11/85 Reiswig, H.M. & H.I. BROWMAN. A filter method for sponge spicule preparation. Third International Conference on the Biology of Sponges, Woods Hole, MA.
- 06/85 Marcotte, B.M. & H.I. BROWMAN. Rhythms, confusions and cognitive skills: a new paradigm for behavioral ecology of fish feeding. Marine Biology Symposium, Huntsman Marine Laboratory, St. Andrews, NB.
- 12/84 Marcotte, B.M. & H.I. BROWMAN. Perceptual aspects of early feeding in larval Atlantic salmon, *Salmo salar*. Gutshop '84, Pacific Grove, CA.

INVITED LECTURES/DEPARTMENTAL SEMINARS

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2017 Institute of Marine Research, Bergen

2016 Institute of Marine Research, Bergen

2015 Université Pierre et Marie Curie, Laboratoire d'Océanographie de Villefranche, Villefranche-sur-Mer, France

2015 University of Miami, Rosenstiel School of Marine and Atmospheric Science, Miami, Florida, USA

2015 Institute of Marine Research, Bergen

2014 Lake Superior State University, Sault Saint Marie, Michigan, USA

2012 National Institute for Aquatic Resources, Technical University of Denmark, Charlottenlund

2012 Fisheries Centre, University of British Columbia

2012 Institute of Biology, University of Bergen

2012 Interuniversity Institute of Marine Science, Eilat, Israel

2012 National Center for Mariculture, Eilat, Israel

2012 School of Ocean Sciences, Bangor University, Wales

2012 University of Hong Kong

2011 Animal Health and Welfare Panel, European Food Safety Authority, Parma, Italy

2011 University of Gothenburg, Department of Marine Ecology - Kristineberg

2010 Laval University, Quebec City, Quebec, Canada

2010 Bigelow Laboratory for Ocean Sciences

2010 McGill University

2010 Woods Hole Oceanographic Institution

2009 Laval University, Quebec City, Quebec, Canada

2009 University of Quebec at Montreal, Montreal, Quebec, Canada

2009 Institute of Marine Research, Bergen, Norway

2009 Texas A&M University, Corpus Christi, Texas, USA

2009 Institute of Marine Research, Tromsø, Norway

2009 Nordland University, Bodø, Norway

2009 University of Hong Kong

2008 Marine Science Centre, University of Quebec at Rimouski, Canada

2008 Maurice Lamontagne Institute, Mont Joli, Quebec

2008 Annual Meeting, Scientist's Union, Bergen, Norway

2008 Shirahama Research Station, Kyoto University, Japan

2008 Maizuru Research Station, Kyoto University, Japan

2007 Hong Kong University of Science and Technology

2007 Chinese Academy of Science, South China Sea Institute of Oceanology, Guangzhou, China

2006 Pacific Biological Station, Department of Fisheries and Oceans Canada, Nanaimo, British Columbia, Canada

2006 U.S. National Marine Fisheries Laboratory, Sandy Hook, New Jersey, USA

2004 Department of Biology, Virginia Technological University, Blacksburg, Virginia, USA

2004 Bedford Institute of Oceanography, Halifax, Nova Scotia, Canada

2004 Department of Biology, University of Quebec at Rimouski, Canada

2004 Maurice Lamontagne Institute, Mont Joli, Quebec, Canada

2003 Marine Science Centre, University of Quebec at Rimouski, Canada

2003 Norwegian Ministry of Fisheries, Oslo, Norway

2002 Department of Biology, Georgia Technology Institute, Atlanta, Georgia

2002 National Research Institute, Montreal, Quebec

2002 Maurice Lamontagne Institute, Mont Joli, Quebec

- 2000 Department of Biology, University of Jyvaskyla, Finland
- 1999 Department of Biology, Lake Superior State University, Michigan, USA
1999 Department of Biology, McGill University, Montreal, Canada
- 1998 Department of Biology, University of Victoria, Victoria, British Columbia, Canada
1998 Department of Fisheries and Oceans Canada, Maurice Lamontagne Institute, Mont-Joli, Québec
1998 Department of Biology, University of Oslo, Norway
1998 The Oceanic Institute, Center for Applied Aquaculture, Waimanalo, Hawaii
- 1997 Department of Marine Biology and Fisheries, University of Bergen, Norway
1997 Oceanography Research Centre, University of Québec at Rimouski
1997 Institute of Marine Research, Austevoll Aquaculture Research Station, Norway
1997 Institute of Zoology, University of Salzburg, Austria
- 1996 Canadian Government Task Force on the Ecological Impacts of Ultraviolet B Radiation, Montréal
1996 Department of Marine Biology and Fisheries, University of Bergen, Norway
1996 Institute of Marine Research, Austevoll Aquaculture Research Station, Norway
1996 Canada Centre for Inland Waters, National Water Research Institute, Ontario
- 1994 Great Lakes Center and Department of Biology, S.U.N.Y. College, Buffalo, NY
1994 Department of Fisheries and Oceans Canada, Maurice Lamontagne Institute, Mont-Joli, Québec
1994 Department of Biology, University of Southwestern Louisiana, Lafayette
1994 Department of Biology, Boston University, Boston, MA
1994 Marine Biological Laboratory, Woods Hole, MA
1994 Oceanography Research Centre, University of Québec at Rimouski
1994 Department of Marine Biology and Fisheries, University of Bergen, Norway
1994 Institute of Marine Research, Austevoll Aquaculture Research Station, Norway
- 1993 Department of Biology, University of South Dakota, Vermillion
1993 Department of Biology, The Flinders University of South Australia, Adelaide
- 1992 Department of Fisheries and Oceans Canada, Maurice Lamontagne Institute, Mont-Joli, Québec
1992 Department of Biology, McGill University, Montréal, Québec
1992 Department of Biology, Hofstra University, Long Island, NY
- 1990 Department of Biology, University of Victoria, Victoria, BC
1990 Biological Station, St. Andrews, New Brunswick
- 1989 Department of Systematics and Ecology, University of Kansas, Lawrence, KS
- 1985 Institute of Oceanography, McGill University, Montréal, Québec
- 1984 Institute of Oceanography, McGill University, Montréal, Québec
1984 Cognitive Sciences Research Group, McGill University, Montréal, Québec

REFERENCES

Names and contact details will be provided upon request.